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A TREATISE

ON

HARMONY.

BY

CHARLES SIMON CATEL,

MEMBER OF THE CONSERVATOIRE DE MUSIQUE AT PARIS.

TRANSLATED BY MRS. COWDEN CLARKE, FROM THE ORIGINAL FRENCH, EXPRESSLY FOR NOVELLO'S LIBRARY FOR THE DIFFUSION OF MUSICAL KNOWLEDGE. THE MUSICAL PORTION HAS ALSO BEEN REVISED BY MR. JOSIAH PITTMAN, ORGANIST OF LINCOLN'S INN.

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BIOGRAPHICAL NOTICE OF CATEL.

Charles Simon Catel, born at l'Aigle, in the month of June, 1773, repaired, when quite young, to Paris, where he devoted himself entirely to the study of music. Sacchini, who took much interest in him, caused him to enter the Royal School for Singing and Declamation, founded, in 1783, by Papillon de la Ferté. Catel there studied the piano, under the direction of Gobert, and of Gossec, who, taking a great liking to him, gave him lessons in harmony and composition. In a short time, he became well skilled in harmony, and in all the branches of the art of writing music. Towards the middle of 1787, he was appointed accompanyist and assistant professor in this same school. In 1790, the directors of the Opera selected him for accompanyist at the theatre; and he retained this situation until 1802, when more important avocations compelled him to resign it. It was in the year 1790, that the band of music of the National Guard was organized under the auspices of Mons. Sarette, who subsequently founded the Conservatoire de Musique, and became its director. The intimate friendship which already subsisted between himself and Catel, determined Mons. Sarette to furnish him with means of displaying his talent, by engaging him in this band as assistant musical director, in conjunction with his master, Gossec. Catel fulfilled the duties of his office by writing a large number of marches and quick movements, which were generally adopted by the French regiments during the wars in the time of the revolution. The first production which marked the talent of Catel for great works was a *De Profundis*, performed in 1702, on the occasion of the funeral honors paid by the National Guard to their major-general, Gouvion.

In the third year of the Republic (1795), when the Conservatoire de Musique was organized, Catel was appointed professor of harmony there. This establishment was hardly completed, ere the views of those distinguished professors, who formed its staff, were directed to the necessity there existed for fixing the basis of a system of instruction, and for compiling elementary works in all branches of the art. Each had his portion of these productions, in consonance with his specific studies; and, according to this arrangement, Catel was entrusted with the compilation of a Treatise on Harmony. The work was proposed amidst an assemblage of ten professors; was adopted; and appeared in the tenth year (1802). This book has been, during a period of twenty years, the sole authority with professors of harmony in France.

From the commencement of the Conservatoire at Paris, Gossec, Mehul, and Cherubini were inspectors there; in 1810, a fourth place of this kind was appointed, and Catel was the one chosen to occupy the post. He did not long enjoy the advantages of this new position; for, the events of 1814 having deprived Mons. Sarette of the administration of the Conservatoire, his friend chose to follow him in his retreat, and sent in his resignation. "Since then," (says Mons. Fétis, writing in 1837,) "he has declined all the situations that have been offered him; his nomination as member of the French Institute, in 1815, being the only one he has accepted. In 1824, he was made Chevalier of the Legion of Honor, without having taken a single step for obtaining the favor."

A strong party existing against the strict school in musical art, of which the Conservatoire was looked upon as the centre, Catel's dramatic productions met with slender success from the Parisian public, and brought their author little fame and less profit. After composing eleven operatic pieces, between the years 1802 and 1819, Catel retired from public life, wrote no more, derived his chief pleasure from encouraging talent in young rising artists, and passed the greater part of each year in a country house he possessed, a few leagues from Paris. Catel composed a variety of instrumental pieces; overtures, military marches, quintetts, quatuors, sonatas for piano-forte, a symphony, several national songs and civic romances, and took large part in the compilation of the "*Solfeggi of the Conservatoire*," of which a second edition was published in 1815, for which he wrote a methodical detail of the principles of music; but the work on which his reputation will chiefly rest, is incontestably his "Treatise on Harmony."

"However excellent the talents of Catel," (proceeds Mons. Fétis,) "they formed only one portion of his title to the esteem—I may say—to the veneration, of those who knew him. To an understanding the most just and clear, to a gift of observation the most discerning, he joined a probity the most strict, together with all the qualities belonging to the purest of natures. For the space of forty years, his friendship, his gratitude towards Mons. Sarette, who had supported him with his utmost influence throughout his career, never for an instant abated; while his benevolence on behalf of young musicians who sought his counsel and assistance, knew no limit."

RESOLUTIONS, PASSED BY THE CONSERVATOIRE DE MUSIQUE, WITH RESPECT TO THE ADOPTION OF CATEL'S TREATISE ON HARMONY.

Commission charged with the compilation of a Treatise on Harmony.

The 11th floreal (1st May),
Ninth year of the Republic (1801).

According to the rules of the Conservatoire, a special commission, consisting of citizens Berton, Catel, Cherubini, Eler, Framery, Gossec, Lacépède, Langlé, Lesueur, Martinj, Méhul, Prony, Rey, and Rodolphe, assembled on the 2nd nivose (22nd Dec.), ninth year of the Republic (1801), for the formation of a Treatise on Harmony, which should serve for instruction in the Conservatoire de Musique.

Several meetings having been dedicated to the consideration of different systems of Harmony, the Commission, on its meeting of the 10th ventose (29th Feb.), agreed to follow the system laid down by citizen Catel, member of the Commission.

On the 11th floreal (1st May), ninth year (1801), citizen Catel submits to the Commission, the definitive compilation of his Treatise on Harmony. After a critical examination of the work, the commission adopt it, and appoint citizen Méhul to make a report of it to the general assembly.

Signed by the members of the Commission,
Gossec, B. G. E. L. Lacépède, Cherubini,
Lesueur, Prony, Eler, Framery, Méhul,
Rey, Martinj, Berton, Rodolphe.

General Assembly of the Members of the Conservatoire.

The 15th floreal (5th May),
Ninth year of the Republic (1801).

Citizen Méhul, in the name of the Commission charged with the compilation of a Treatise on Harmony, declares:—

"That the Commission, after having consulted the best works upon Harmony, in order to confirm themselves from highest authority, or to contest errors consecrated by time, but which time should destroy, has audited the detail of three new systems submitted to its examination.

"The two first, diametrically opposite in theoretical principles, gave rise to discussions, both animated and valuable, but of which the result, while attesting the learning of the members of the Commission, failed in attaining the end proposed. Rameau's system was successively attacked and defended. The suffrages it obtained, did not gain over its opponents, who still objected to this theory its incomplete definitions, even while rendering justice to what it contains of true and important upon the creation and generation of the great family of chords.

"In the conflict of differing opinions, between the partisans and the antagonists of the system of fundamental bass, the Commission, unable to discern the whole truth, suspended its judgment, until the work now submitted for your approval came to terminate all discussion, by offering a complete system, simple in its principles, and clear in its definitions.

"In order to make it known to the assembly, citizen Catel, its author, will address them after the perusal of the resolution of adoption, declared by the Commission in its meeting of the 11th floreal (1st May)."

Citizen Catel thereupon sets forth his system of Harmony; and after mature deliberation, the general assembly unanimously adopt it, according to the form prescribed by the Rules of the Conservatoire, for the instruction of the classes in this establishment.

Sarrette, *President.*

AUTHOR'S PREFACE.

So many different Treatises on Harmony having already been published, several of which enjoy a merited reputation, it may appear somewhat presumptuous to offer another to the Public, essentially varying from those generally accepted throughout France. I should therefore hardly have ventured to put forth this one, had not the Conservatoire, by adopting it, in some measure made its publication a duty.

I hold, that all the various systems have one and the same object, and that they merely differ from each other, in the means taken to effect it; in publishing mine, therefore, I do not seek to confute those which may be dissimilar.

I have undertaken this work, with a view to simplify, as much as possible, the elements of Harmony; I have sought to retrace it to its true origin, showing that in fact all discords are formed out of concords. I have reduced chords to a very small number; by giving the name of chord to those only which need no preparation, and which naturally exist in a sonorous body. I have divided harmony into two classes:—simple, or natural harmony; and compound, or artificial harmony.

Simple harmony comprises all chords that need no preparation. Compound harmony is founded upon simple harmony; it is formed by the suspension of one or more parts, which prolong one or more notes of a chord on to the following chord.* Every progression of simple harmony may become compound, by the means of prolongation; and every compound progression may become simple, by suppressing prolongation. It is evident, therefore, that simple harmony is the general foundation of every dissonant progression.

This method appears to me to unite the double advantage of teaching the real nature of every chord, at the same time that its use is learned. The pupils thus avoid the almost insurmountable difficulty of classing in their memory that numerous series of isolated chords, which, standing as so many different chords, render harmony arduous of comprehension, and still more arduous of practice.

If to this be added, that in the majority of Treatises on Harmony little more is taught than the name of the several chords, and the method of striking them on the clavier,† it will readily be seen, that after having learnt harmony by such means, the pupil remains a complete novice in the art of counterpoint; and that if he resolve upon mastering it, he will have to recommence the study of composition by the progression of concords, concerning which he knows nothing, although he may be acquainted with the name of every chord that exists.

I have therefore made it my object in this work to teach harmony by instilling the elements of counterpoint; and experience will prove whether my idea has been successfully executed.

* If the common chord, C, E, G, be followed by the common chord, F, A, C, the HARMONY is SIMPLE. If, on the second chord, the third of the first chord be prolonged, this prolongation will form a discord of the seventh on the common chord. If, on the second chord, the fifth of the first chord be prolonged, this prolongation will form a discord of the ninth on the common chord; and then the HARMONY is COMPOUND.

† These works are styled:—TREATISES ON ACCOMPANIMENT.

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CATEL'S

TREATISE ON HARMONY.

PRELIMINARY MATTER.

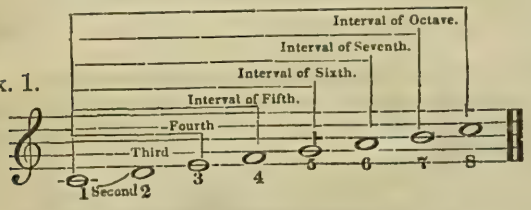
Intervals.

An interval is the distance which divides one note from another.

In harmony, intervals are counted from the lower to the upper part; and the bass being the lowest part, it is from thence that the intervals which form the chords are reckoned.

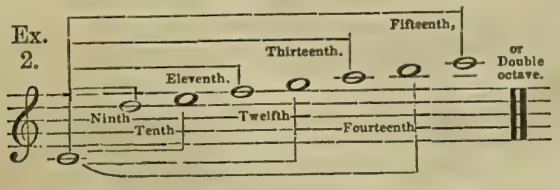
A scale includes the intervals of the second, third, fourth, fifth, sixth, seventh, and octave:—

Ex. 1.



By doubling the intervals, those of the ninth, tenth, eleventh, twelfth, thirteenth, fourteenth, and fifteenth are found; forming the repetition of the others, from the octave upwards:—

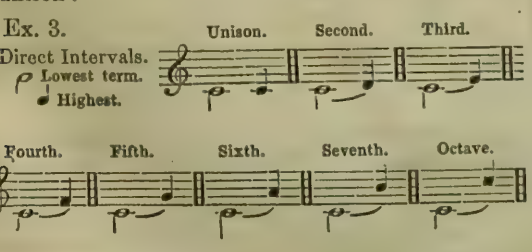
Ex. 2.



By inverting the intervals,—that is to say, by transposing the lower to the higher,—the unison becomes an octave, the second becomes a seventh, the third becomes a sixth, the fourth becomes a fifth, the fifth becomes a fourth, the sixth becomes a third, the seventh becomes a second, and the octave becomes a unison:—

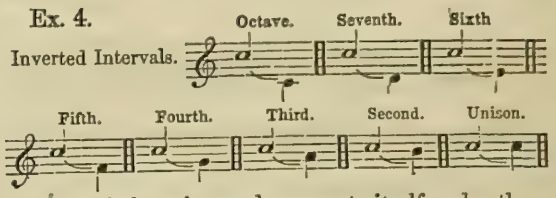
Ex. 3.

Direct Intervals.



Ex. 4.

Inverted Intervals.



Each of these intervals presents itself under three different aspects.

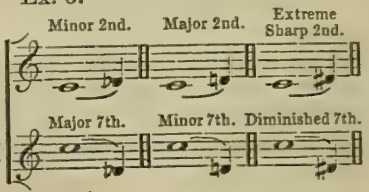
Table of Intervals,

With their inversions, under the three different aspects.

Ex. 5.

There are three species of the second; viz., the minor, the major, and the extreme sharp.*

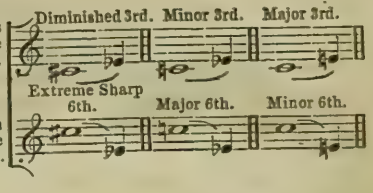
Their inversions form the major, minor, and diminished 7th.†



Ex. 6.

There are three species of the third; viz., the diminished, the minor, and the major.

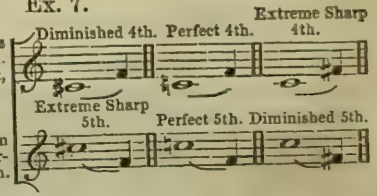
Their inversions form the extreme sharp, the major, and the minor 6th.



Ex. 7.

There are three species of the fourth; the diminished, the perfect, and extreme sharp.

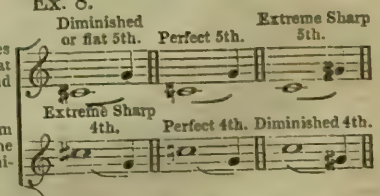
Their inversions form the extreme sharp, perfect, and diminished 5th.



Ex. 8.

There are three species of the fifth; the flat fifth, the perfect, and the extreme sharp.

Their inversions form the extreme sharp, the perfect, and the diminished 4th.



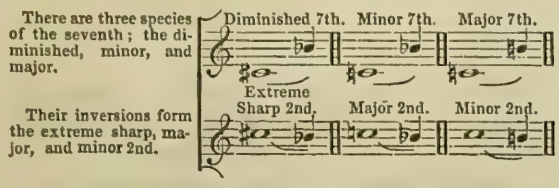
* "Extreme sharp" is used instead of "superfluous."

† "Diminished" is used instead of "false."

Ex. 9.



Ex. 10.



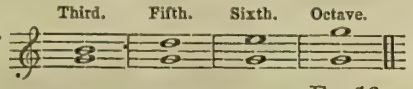
The unison and the octave do not alter.

Concords and Discords.

Intervals are divided into consonant intervals and dissonant intervals.

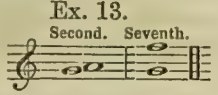
The consonant intervals, or concords, consist of the third, the fifth,* the sixth, and the octave:—

Ex. 12.



The dissonant intervals, or discords, consist of the second, and the seventh:—

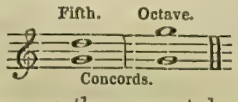
Ex. 13.



The concords are divided into perfect and imperfect concords.

The perfect concords consist of the fifth, and the octave:—

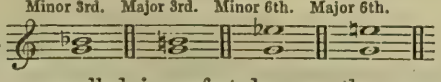
Ex. 14.



They are called perfect, because they cannot be altered without ceasing to be concords.†

The imperfect concords consist of the third, and the sixth:—

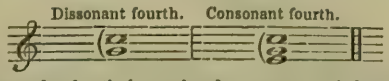
Ex. 16.



They are called imperfect, because they may be major and minor without ceasing to be concords.‡

* The fourth, being an inversion of the fifth, should be considered as a concord; but its effect being much less agreeable than that of the fifth, it is regarded as a discord against the bass, and as a concord between the middle and upper parts:—

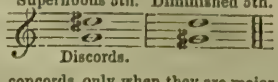
Ex. 11.



Nevertheless, the fourth is employed as a concord in the second inversion of the common chord; and moreover this inversion is the least agreeable, and the only one of which a succession is not permitted.

† Since the fifth cannot be altered without ceasing to be a concord, the diminished fifth and the superfluous fifth should be considered as dissonant intervals, or discords:—

Ex. 15.



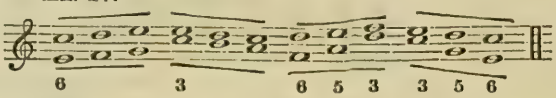
‡ The third and the sixth being concords only when they are major and minor, the diminished third and the superfluous sixth should be considered as discords.

Movement.

There are three kinds of movement; direct movement, oblique movement, and contrary movement.

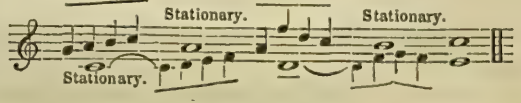
Direct movement is that which occurs when two parts ascend and descend at the same time:—

Ex. 17.



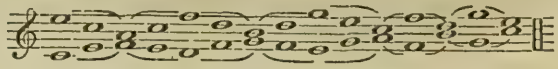
Oblique movement is that which occurs between two parts, when one of them remains stationary while the other ascends or descends:—

Ex. 18.



Contrary movement is that which occurs between two parts, when one of them ascends while the other descends:—

Ex. 19.

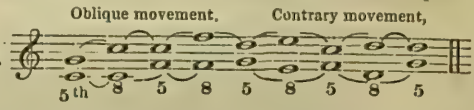


Oblique movement, and contrary movement (especially the latter), are those which offer the best resource, and the greatest richness of effect, in harmony.

Progression of Concords.

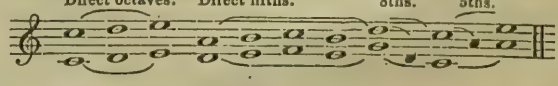
A succession of perfect concords can be used only in oblique movement, or in contrary movement:—

Ex. 20.



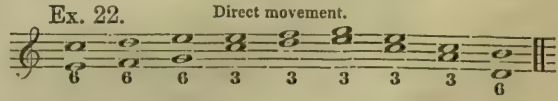
Perfect concords used in direct movement, will produce successive fifths and octaves, either direct or concealed; which should be carefully avoided:— §

Ex. 21.

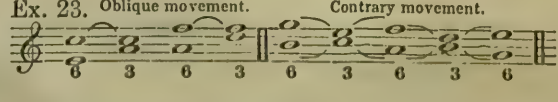


A succession of imperfect concords may be used in each of the three kinds of movement:—

Ex. 22.



Ex. 23.



§ In three, or in four parts, concealed fifths and octaves are tolerated; in the middle parts, between concords only.

ARTICLE I.

General Theory of the Chords.

In harmony, there is but one single chord, which contains all the others.

This chord is formed of the primary emanations from a sonorous body, or of the first divisions of the monochord.

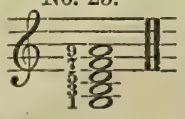
An entire string in its tension shall give out the sound of G. A half string gives a G at the octave of the 1st; a third of the string gives a D at the 12th; a fourth of the string gives a G at the double octave; a fifth of the string gives a B at the 17th; a sixth of the string gives a D, octave of the 3rd, or 19th above; a seventh of the string gives an F at the 21st; an eighth of the string gives a G at the triple octave; a ninth of the string gives an A at the 23rd :—

Ex. 24.



Thus, by setting out from the fourth of the string, or from the double octave of the first sound, there will be found, in a progression of thirds, the chord G, B, D, F, A :—

No. 25.

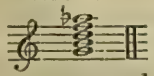


By commencing this operation at the triple octave, which is an eighth of the string, and by omitting the intermediate notes, the chord of G, B, D, F, A♭ will be found, which is the same chord as the preceding, but in the minor mode :—

No. 26.

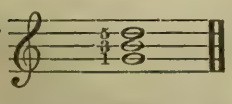


Ex. 27.

This chord  contains all those employed in harmony; namely :—

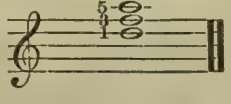
Major Common Chord.

Ex. 28.



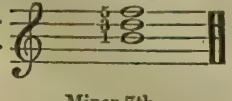
Minor Common Chord.

Ex. 29.



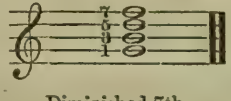
Imperfect Common Chord.

Ex. 30.



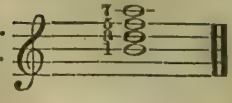
The Dominant 7th.

Ex. 31.



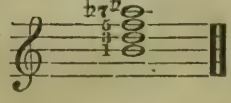
Minor 7th.

Ex. 32.



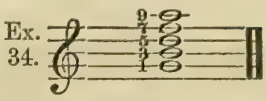
Diminished 7th.

Ex. 33.



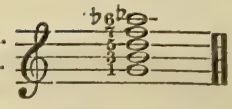
Major 9th.

Ex. 34.



Minor 9th.

Ex. 35.



These chords, and their inversions, are the only ones which can be given without preparation. They form what I call Simple or Natural Harmony.

The other chords employed in Harmony are constructed by the prolongation of one or more notes of a chord on to the following chord. They form Compound Harmony.

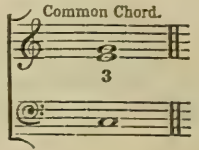
ARTICLE II.

The Major Common Chord.

The major common chord consists of the major third and fifth.

Ex. 36.

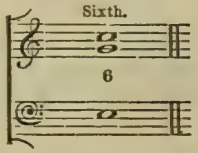
Common Chord.



It is figured by 5, 3, or 8, according to circumstances. [Vide Article XIV.]

Ex. 37.

Sixth.



Its first inversion, or derivative, consists of the minor third, and the minor sixth. It is called the chord of the sixth. It is figured by 6 :—

Ex. 38.

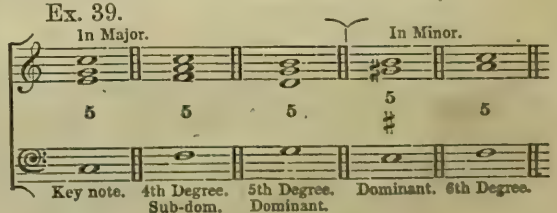
Six-four.



Its second inversion consists of the fourth, and the major sixth. It is called the chord of the six-four. It is figured by $\frac{6}{4}$:—

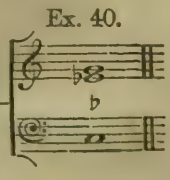
The major common chord is placed on the tonic. It is likewise placed on the sub-dominant, and the dominant, in a major key; and on the dominant and sixth degree of the scale in a minor key :—

Ex. 39.



The Minor Common Chord.

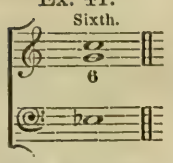
Ex. 40.



The minor common chord consists of the minor third and a fifth :—

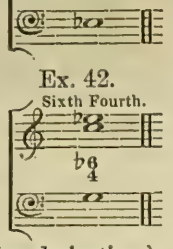
Its first inversion consists of the major third and the major sixth :—

Ex. 41.



Its second inversion consists of the fourth, and the minor sixth :—

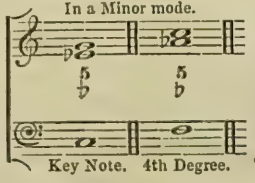
Ex. 42.



This chord, and its inversions, (or derivatives), are figured like the major common chord; indicating, with the figures, those accidentals which are not specified by the clef.

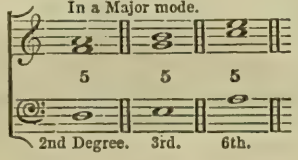
The minor common chord is placed on the tonic of the minor key. It is also placed on the fourth degree of the scale of the same key :—

Ex. 43.



In a major key, the minor common chord is placed on the second, the third, and the sixth degrees of the scale :—

Ex. 44.



The Imperfect Common Chord.

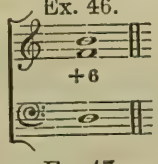
The imperfect common chord consists of the minor third, and the diminished fifth.* It is figured by 5 :—

Ex. 45.



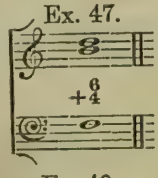
Its first inversion (or derivative) consists of the minor third, and the major sixth. It is figured by +6 :—

Ex. 46.



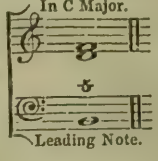
Its second inversion consists of the superfluous fourth, and the major sixth. It is figured by $+\frac{6}{4}$:—

Ex. 47.

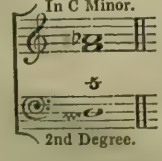


The imperfect common chord is placed on the 7th degree of the major key, and on the second degree of the minor key :—

Ex. 48.



Ex. 49.



* This chord consists of the third and the fifth, like the major and minor common chord; but it is styled imperfect, on account of the diminished fifth, which is not a consonant interval.

Observation.—Although the interval of a diminished fifth be not a consonant one, yet this chord cannot be classed among discords, inasmuch as none of the notes which compose it possess a determined progression (as is the case with all the discords), but may either ascend, descend, or remain stationary; from which it may be deduced, that, if this chord be less perfect than the two others, it can nevertheless be employed in effecting a momentary repose before reaching the final cadence: and therefore, it should be ranked among concords.

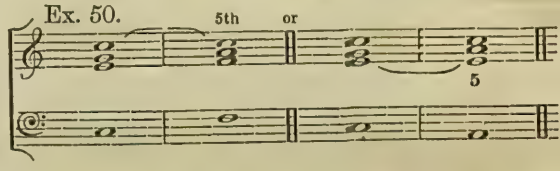
The common chord may be placed on every degree or note of the scale.

Common chords should succeed each other in such a manner, as that at least one note of a chord shall form part of the following chord.

The best way of combining common chords with each other, is by preparing their several fifths :—

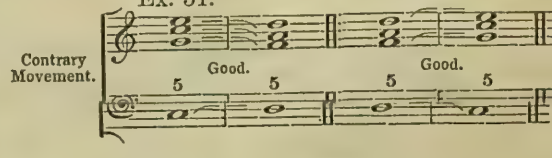
Preparation of the Fifth.

Ex. 50.

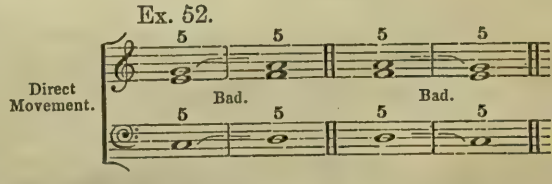


Nevertheless several common chords may follow each other without any connection; in which case, contrary movement should be employed between the parts, in order to avoid the successive fifths that would necessarily result from direct movement :—

Ex. 51.

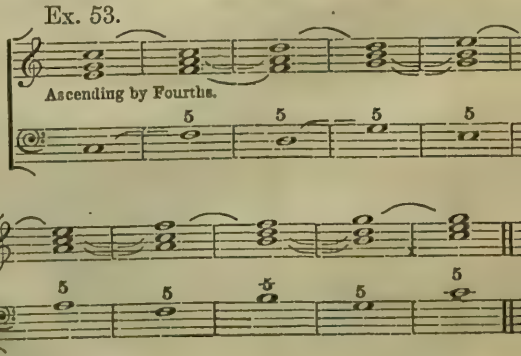


Ex. 52.



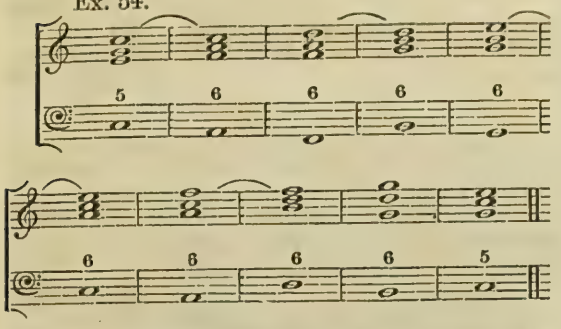
A series of common chords, in which all the fifths are prepared :—

Ex. 53.



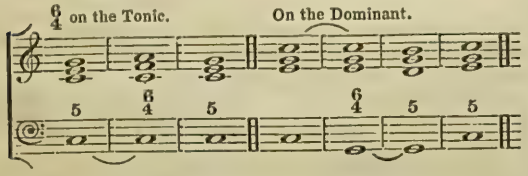
A series of sixths; first inversion of the preceding common chords :—

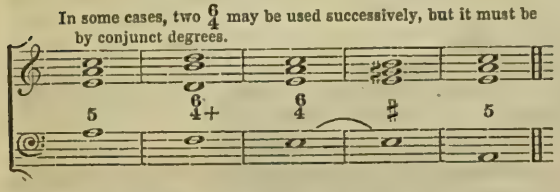
Ex. 54.



The second inversion would give a succession of six-fours, which is not used, on account of its vague and somewhat harsh effect. The chord of the six-four is seldom employed, excepting on the tonic and on the dominant :—

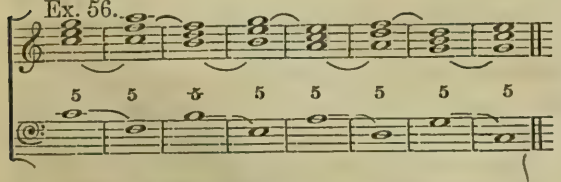
Ex. 55.





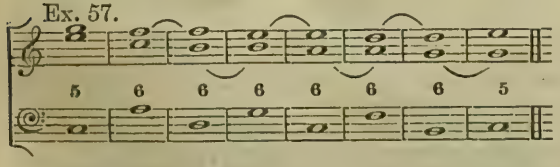
Another series of common chords, with all the fifths prepared :—

Ex. 56.



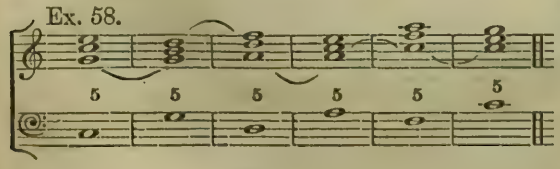
A series of sixths, inversion of the same passage :—

Ex. 57.

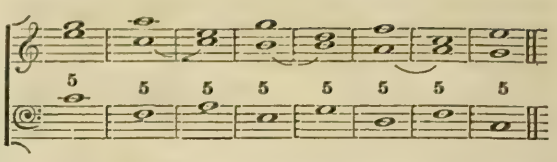


A series of common chords in which the fifths are not prepared :—

Ex. 58.

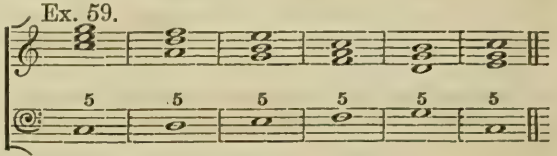


Another series :—



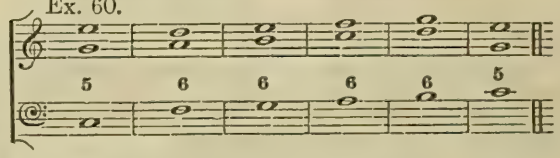
A series of common chords which have no connection with each other :—

Ex. 59.



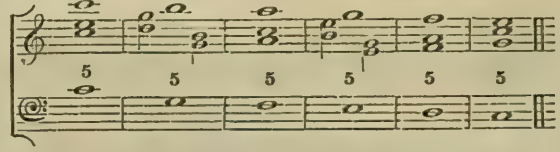
A series of sixths, inversions of the preceding progression. The series proceeds by direct movement :—

Ex. 60.



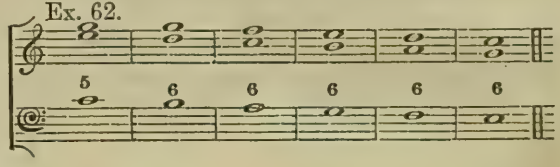
Another series of common chords, descending :—

Ex. 61.



Series of sixths; inversion of the preceding :—

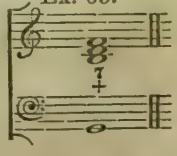
Ex. 62.



ARTICLE III.

The Dominant Seventh.

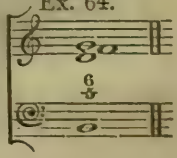
Ex. 63.



The chord of the dominant seventh consists of the major third, the fifth, and the minor seventh. It is figured by 7, or 7. It is placed on the fifth of the key :—

The seventh is a discord, and must descend by one degree; while the leading note must ascend by one degree. Its first inversion consists of the minor third, the diminished fifth, and the minor sixth. It is figured by 6/5. It is called the chord of the sixth and diminished fifth. It is placed on the leading note :—

Ex. 64.



Its second inversion consists of the minor third, the fourth, and the major sixth. It is figured by $\frac{+}{4}{}_{3}$ or $+6$. It is called the chord of the little sharp sixth. It is placed on the second note of the key:—

Ex. 65.



Its third inversion consists of the major second, the superfluous fourth or tritone, and the major sixth. It is called the chord of the tritone. It is figured by $\frac{+}{2}$ or by $+4$:—

Ex. 66.



The chord of the dominant seventh is resolved on the tonic; which produces a repose in harmony called a perfect cadence:—

Ex. 67. Major.



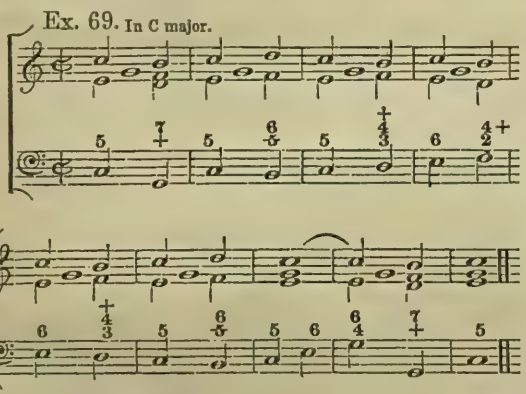
Ex. 68. Minor.



This chord is the same in both modes.

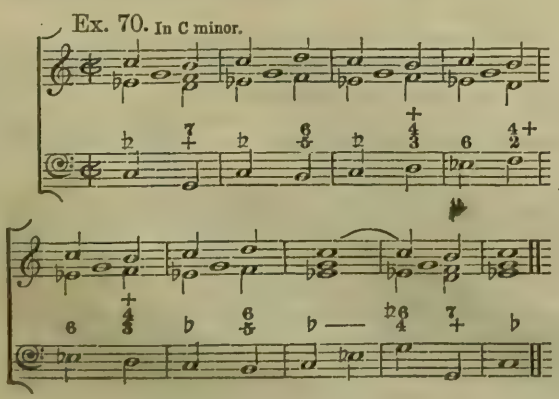
Method of employing the dominant seventh in the major mode:—

Ex. 69. In C major.



Method of employing the dominant seventh in the minor mode:—

Ex. 70. In C minor.

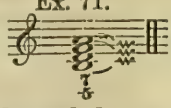


ARTICLE IV.

The Imperfect Seventh in the Major Mode.

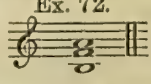
The chord of the imperfect seventh consists of the minor third, the diminished fifth, and the minor seventh. It is placed on the leading note:—

Ex. 71.



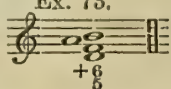
The seventh, which is a discord, descends by one degree. The fifth, which is diminished,—and consequently a discord,—descends also by one degree, and the leading note ascends by one degree. This chord is figured by $\frac{7}{5}$. That its effect may be the more agreeable, the third is omitted:—

Ex. 72.



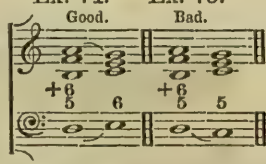
Its first derivative (or inversion) consists of the minor third, the fifth, and the major sixth. It is called the chord of the great sixth. It is figured by $+\frac{6}{5}$:—

Ex. 73.



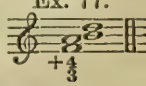
It is placed on the second note of the key, which must ascend, in order to avoid the two fifths:—*

Ex. 74. Good. Ex. 75. Bad.



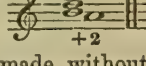
Its second derivative (or inversion) consists of the major third, superfluous fourth, and major sixth. It is called the chord of the tritone and major third. It is figured by $+\frac{4}{3}$. It is placed on the fourth note of the key:—

Ex. 77.



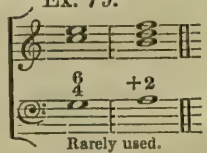
Its third derivative consists of the major second, the fourth, and the minor sixth. It is called the chord of the second. It is figured by $+2$. It is placed on the sixth note of the key:—

Ex. 78.

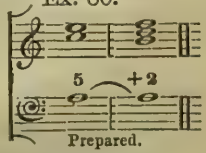


Although this inversion may be made without preparation, it is rarely used so; its effect is much more agreeable when the discord is prepared:—

Ex. 79.



Ex. 80.

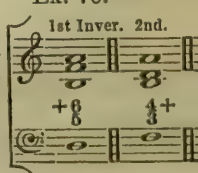


Observation.—This chord is resolved on the tonic, as well as the dominant seventh. These two chords possess three notes in common.

On each of these notes either of the two chords may be placed; or even both alternately.

The similarity which exists between these two chords

Ex. 76.



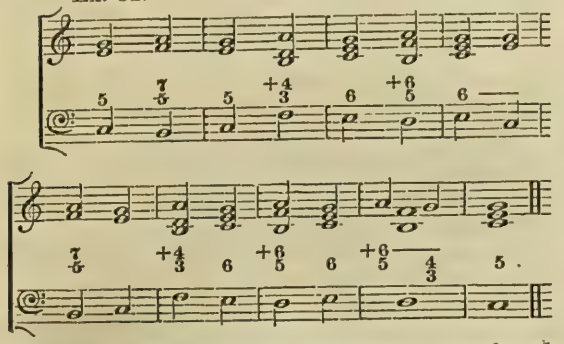
* That the first and second derivatives of this chord may be employed in a more agreeable manner, the interval of a second which occurs, should be introduced as its inversion of a seventh:—

proves their identity; and clearly demonstrates that they originate from the same source.

The fundamental sound* of the dominant seventh should therefore be considered as that of the imperfect seventh.

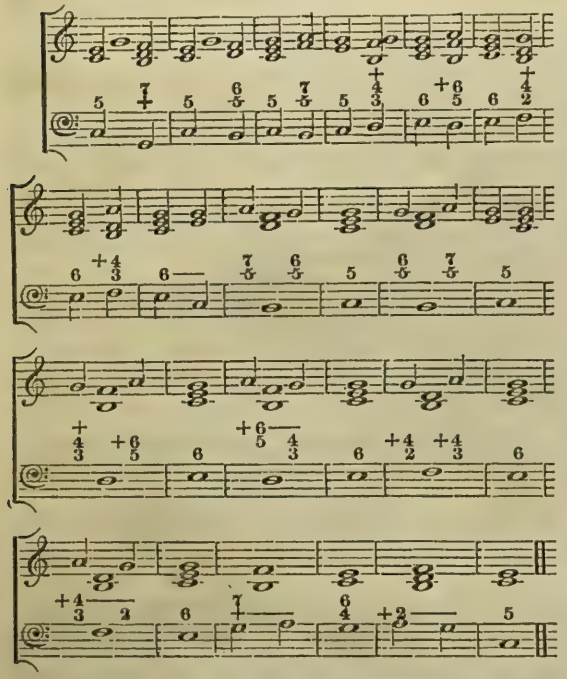
Method of employing the imperfect seventh in the major mode:—

Ex. 81.



Method of employing the dominant seventh and the imperfect seventh alternately:—

No. 82.

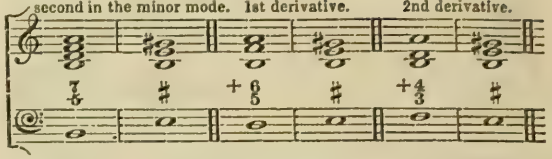


The chord of the imperfect seventh does not exclusively pertain to the major mode. There are cases, where it may be employed without preparation on the second note of the relative minor key. It is then called the chord of the seventh on the second of the minor key. It is resolved on the dominant.† It is figured, and also its derivatives, as in the major mode. Its third derivative is not used without preparation:—

* The fundamental sound of a chord is its lowest note, when the chord is in a progression of thirds.

† In the minor mode, the fundamental sound (or root) of this chord is the lowest note of the chord itself; and not the dominant, as in the major mode.

Ex. 83. Chord of the seventh on the second in the minor mode. Ex. 84. 1st derivative. Ex. 85. 2nd derivative.

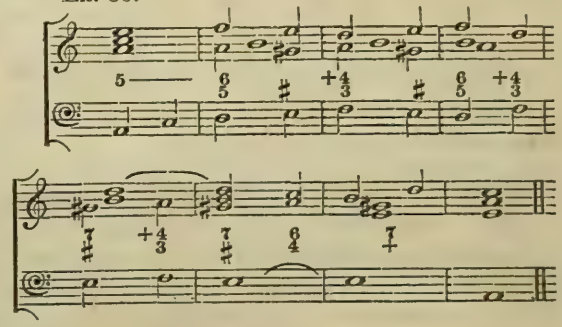


It is this double use, which has caused this chord to be called the mixed seventh.

Since, in the minor mode, this chord is much more frequently used by preparing the seventh, than without preparation; it is no other than an imperfect common chord, receiving a prolongation of the seventh. Thus, it ranks among simple chords, which receive the prolongation of an alien note. (See Article VII, on Prolongations, page 14.)

Method of employing the seventh on the second of the minor mode without preparation:—

Ex. 86.

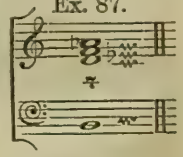


ARTICLE V.

The Diminished Seventh.

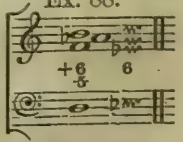
The diminished seventh is the imperfect seventh of the minor mode. It consists of the minor third, the diminished fifth, and diminished seventh, which make 3 minor thirds. This chord is placed on the leading note of the minor mode. It is figured by ♮:—

Ex. 87.



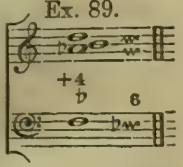
The seventh, which is a discord, should descend by one degree; the fifth, which is diminished, should also descend by one degree; and the leading note should ascend by one degree.‡ Its first inversion (or derivative) consists of the minor third, the diminished fifth, and the major sixth. It is called the chord of the sharp sixth with false fifth. It is figured by $+\frac{6}{5}$; and is placed on the second note of the key:—

Ex. 88.



Its second inversion consists of the minor third, the superfluous fourth, and the major sixth. It is called the chord of the tritone and minor third. It is figured by $+\frac{4}{\flat}$; and is placed on the fourth note of the key:—

Ex. 89.



‡ This chord pertains exclusively to the minor mode; it can only be employed in the major mode by a licence.

Its third inversion consists of the extreme sharp second, the sharp fourth, and the major sixth. It is called the chord of the extreme sharp second. It is figured by +2 ; and is placed on the sixth note of the key :—

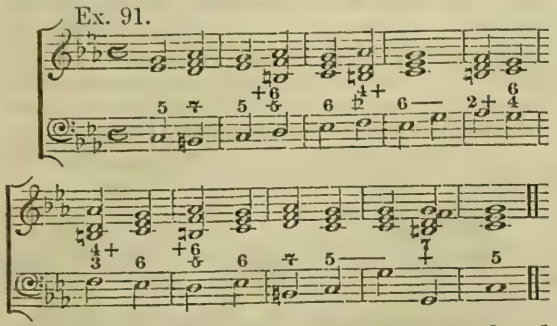
Ex. 90.



The chord of the diminished seventh is resolved on the tonic.

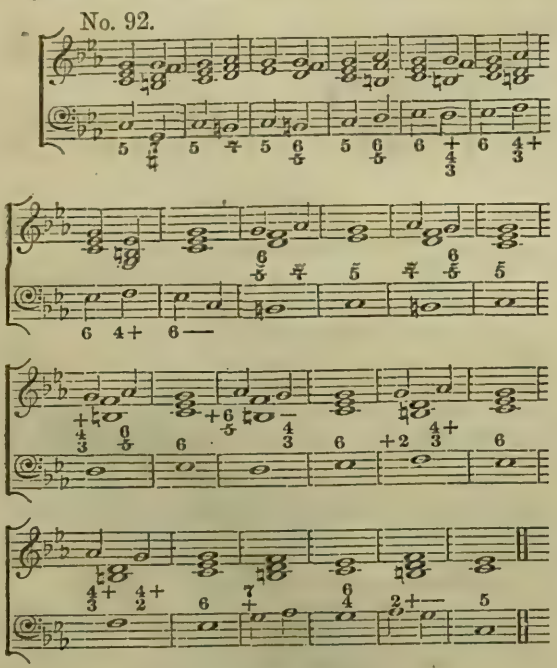
All that was said upon the imperfect seventh, as regards its relations with the dominant seventh, applies equally to the diminished seventh.

Ex. 91.



Method of employing the diminished seventh and the dominant seventh :—

No. 92.

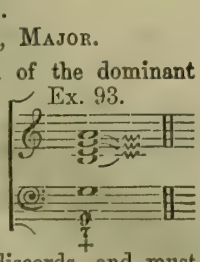


ARTICLE VI.

The Dominant Ninth, Major.

This chord is a combination of the dominant seventh and the imperfect seventh together. It consists of the major third, fifth, minor seventh, and major ninth. It is figured by $\frac{9}{7}$; and is placed on the dominant :—

Ex. 93.



The seventh and ninth are discords, and must descend by one degree.

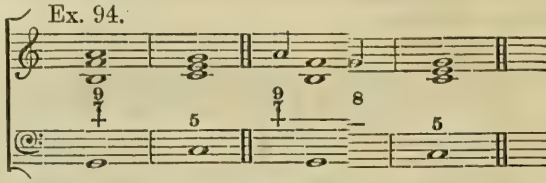
They may be resolved either at the same time, or one after the other, by beginning with the ninth.

The leading note must ascend by one degree.

This chord is resolved on the tonic.

The fifth should be omitted, to render the effect less harsh :—

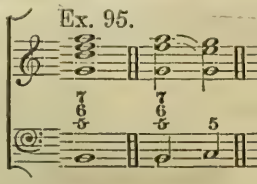
Ex. 94.



This chord is susceptible of inversions; but the fundamental sound should always be at the distance of a ninth from the discord, this interval not being susceptible of inversion.

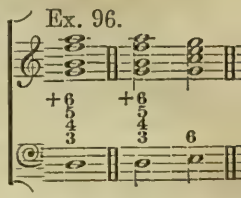
The first inversion consists of the minor third, the diminished fifth, the minor sixth, and minor seventh, at the octave above. It is figured by $\frac{7}{6}$; and is placed on the leading note :—

Ex. 95.



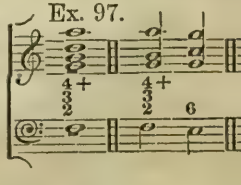
The second inversion consists of the minor third, the fourth, the fifth at the octave above, and the major sixth. It is figured by $\frac{+6}{5\ 4\ 3}$ This inversion is the least used :—

Ex. 96.



The third inversion consists of the major second, the major third at the octave above, the superfluous fourth, and major sixth. It is figured by $\frac{4}{3\ 2}$:—

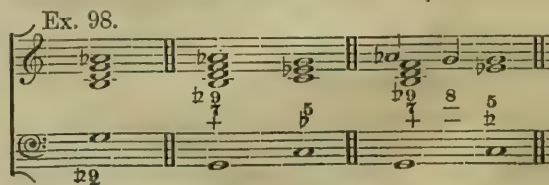
Ex. 97.



The Dominant Ninth, Minor.

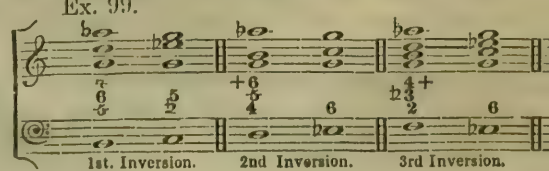
This chord is the same as the preceding; with the exception of the ninth, which is minor. It is an amalgamation of the dominant seventh, and of the diminished seventh. It is figured by $\frac{\flat 9}{7}$:—

Ex. 98.



It is employed in the same manner as the preceding, as well as its inversions :—

Ex. 99.



ARTICLE VII.

Passing Notes; Prolongations; Suspensions; and Retardations.

Natural harmony being composed only of common chords, dominant sevenths, and sevenths on the leading note, the too frequent recurrence of the same chords produces a monotony that is obviated by means of certain artificial discords introduced into simple harmony. These discords are of two kinds: passing notes, and prolonged notes.

Passing Notes.

Passing notes are employed on the unaccented part of the bar, or on the unaccented portions of time in the bar.

They are not akin to the chords, upon which they merely touch, without becoming identified with them.

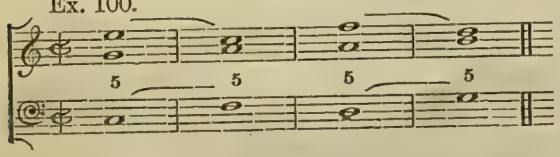
They serve to fill up the space of an interval of a third, of a fifth, &c.

They should always proceed diatonically; that is to say, they should proceed by conjunct degrees, whether in ascending or descending.

The rule which forbids two fourths, two fifths, or two octaves in succession, applies to passing notes as if they formed part of the harmony.

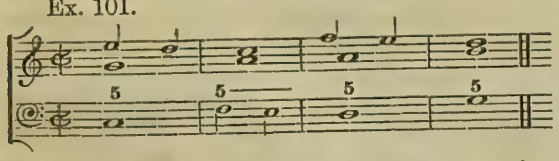
Natural harmony, with a leap of a third in the melody and a leap of a fourth in the bass:—

Ex. 100.



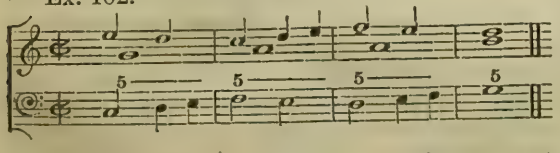
The leap of a third filled up by a passing note in the melody and in the bass:—

Ex. 101.



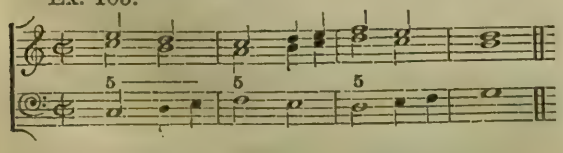
The leap of a fourth filled up by two passing notes in the melody and in the bass:—

Ex. 102.



The second part containing the passing notes at a third below the first part:—

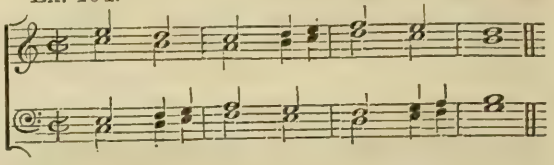
Ex. 103.



The third part containing the passing notes at a third above the bass.

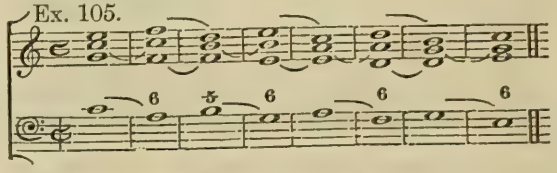
In this example the four parts contain passing notes by contrary movement:—

Ex. 104.



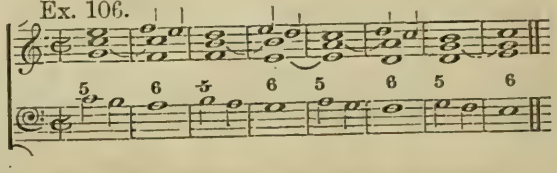
Natural harmony, with a leap of a third in the melody and bass:—

Ex. 105.



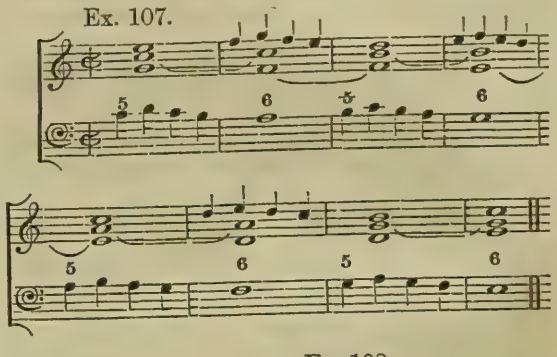
The leap of a third filled up in the melody and bass by a passing note, placed on the unaccented part of the bar:—

Ex. 106.



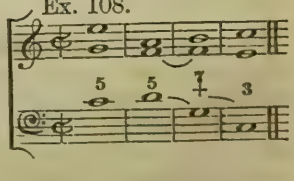
A passing note placed on the unaccented part of each portion of the bar in the treble and bass:—

Ex. 107.



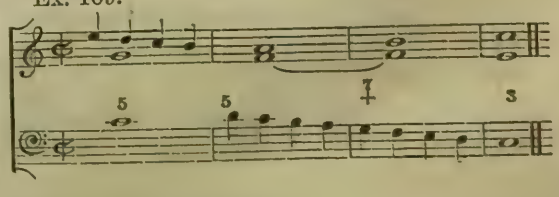
Natural harmony, with a leap of a fifth in the melody and bass:—

Ex. 108.



The leap of a fifth filled up by passing notes, in the melody and bass:—

Ex. 109.

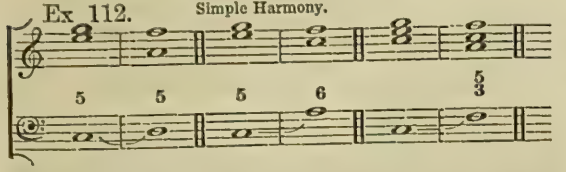


Prolonged Notes.

One or more notes of a chord may be prolonged on to the following chord.

The prolonged note is a discord which must descend by one degree, either in the chord itself on to which it is prolonged, or in the following chord :—*

Ex. 112. Simple Harmony.



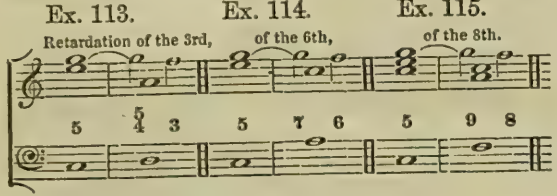
Prolongation is generally no more than the retardation of a note of the chord. In this case, it may be resolved in the chord itself, on the note which it retarded.

That is called a chord of suspension, in which one or more notes are retarded :—

Ex. 113. Retardation of the 3rd,

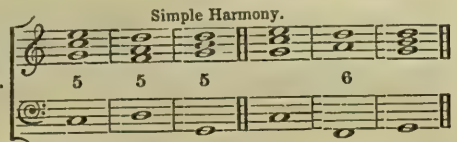
Ex. 114. of the 6th,

Ex. 115. of the 8th.

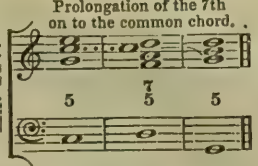


Prolongation may also be effected on a chord already complete, in which the prolonged note is not resolved; but it must necessarily be resolved in the following chord, by descending one degree :—

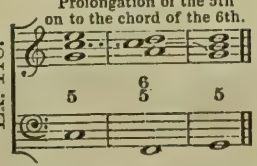
Ex. 116. Simple Harmony.



Ex. 117. Prolongation of the 7th on to the common chord.



Ex. 118. Prolongation of the 5th on to the chord of the 6th.

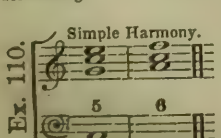


Prolongations produce discords of the second, the third, the fourth or eleventh, the fifth, the sixth or thirteenth, the seventh, and the ninth.

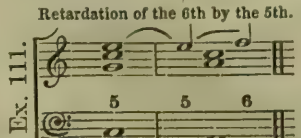
A prolongation is made on the accented part of the bar, or on the accented portion of it; and the resolution is made on the unaccented part :—

* There are cases, where the prolonged note is a retardation of an upper note; on such an occasion, it should ascend by one degree, instead of descending :—

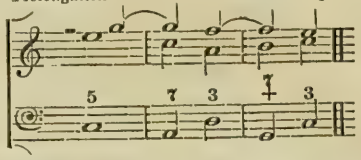
Ex. 110. Simple Harmony.



Ex. 111. Retardation of the 6th by the 5th.

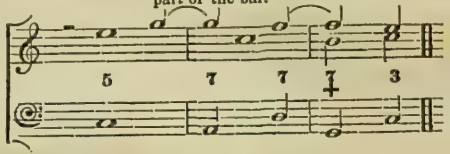


Ex. 119. Prolongation of the 7th on to the accented part.

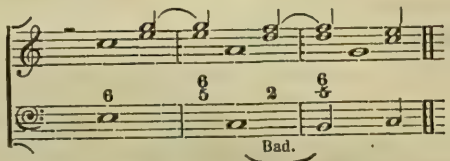


A prolongation may also be made on the unaccented part of the bar, when it has already been made on the accented part; excepting in the bass, which does not admit of it on the unaccented part :—

Ex. 120. Prolongation of the 7th on the accented and unaccented part of the bar.



Ex. 121.



The prolonged note should have at least as long a duration when a concord, as when a discord.†

This rule is by no means indispensable :—

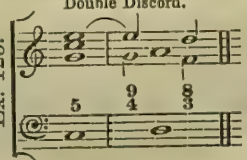
Ex. 122.



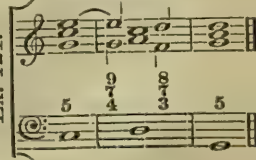
Not only one, but two or three notes may be prolonged simultaneously, which produces double and triple discord.

Each of these discords should find its resolution either in the chord itself, or in the following chord :—

Ex. 123. Double Discord.



Ex. 124. Triple Discord.‡

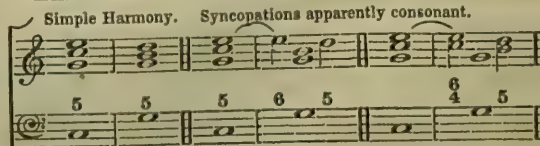


The prolonged note is a discord, when it forms an interval of a second or a seventh, with one of the notes of the chord, on to which it is prolonged; but in the contrary case, it is apparently a concord although it is really a discord, since it is not akin to the chord :—

Ex. 125. Simple Harmony.

Ex. 126. Syncopations apparently consonant.

Ex. 127.



† The concord which precedes a discord, is called its preparation.

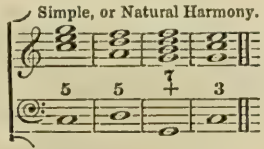
‡ This chord is known as the chord of the eleventh.

Ex. 128. Simple Harmony. Ex. 129. Syncopations apparently Consonant.



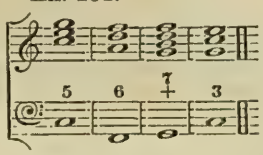
The second chord in this example, is a common chord on the second note of the key. This is the chord which will be inverted in the following examples; and it is upon this chord and its inversions, that all the prolongations will be made:—

Ex. 130. Simple, or Natural Harmony.



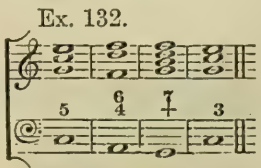
Ex. 131.

The first inversion presents a simple chord of the sixth:—



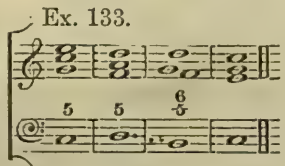
Ex. 132.

The second inversion presents a chord of the fourth and sixth:—



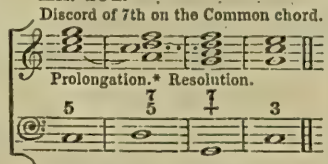
Ex. 133.

In this example the common chord is not inverted, but it descends a third:—



The C prolonged on the chord of D, forms a discord of a seventh on the common chord of D. This discord is resolved by descending one degree on the chord of the dominant seventh:—

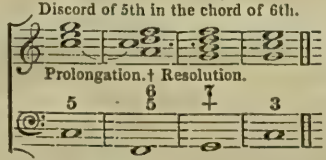
Ex. 134. Discord of 7th on the Common chord. Prolongation.* Resolution.



No. 135. Discord of 5th in the chord of 6th.

The C prolonged on the F, forms a discord of a fifth in the chord of the sixth:—

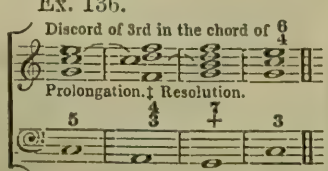
Prolongation.† Resolution.



Ex. 136. Discord of 3rd in the chord of $\frac{6}{4}$.

The C prolonged on the A, forms a discord of a third in the chord of the six-four:—

Prolongation.‡ Resolution.



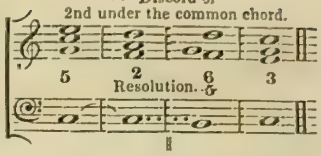
* This chord is known as that of the minor seventh.

† This chord is known as that of the fifth and sixth, or first derivative of the minor seventh.

‡ This chord is known as that of the little sixth, or second derivative of the minor seventh.

The C prolonged in the bass, under the chord of D, forms a discord of a second, § beneath the common chord:—

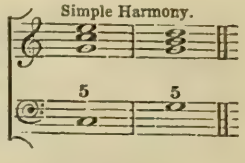
Ex. 137. Discord of 2nd under the common chord. Resolution.



Ex. 138.

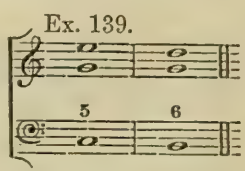
In this example, the second chord is a major common chord; upon which, and its inversions, the prolongation will be made:—

Simple Harmony.



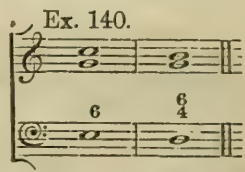
Ex. 139.

The first inversion is a chord of the sixth:—



Ex. 140.

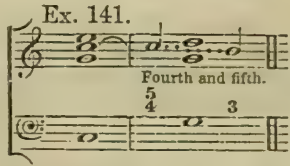
The second inversion is a chord of a fourth and sixth:—



Ex. 141.

Discord of a fourth, retarding the third in the common chord:—

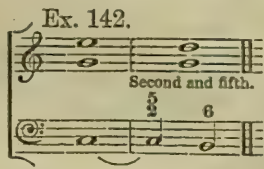
Fourth and fifth.



Ex. 142.

Discord of a second retarding the chord of the sixth:—

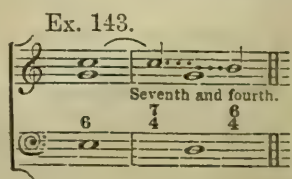
Second and fifth.



Ex. 143.

Discord of a seventh retarding the chord of the six-four:—

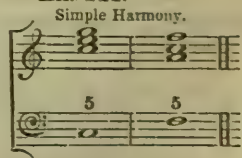
Seventh and fourth.



Ex. 144.

In this example, the second chord is a major common chord:—

Simple Harmony.

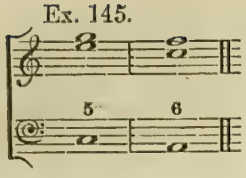


§ It should be observed that when the term *Discord of the second* is used, it is not the second which is the discord, but the note itself of the bass; whereas, when the terms are used—discord of the third, of the fourth, of the fifth, of the seventh, &c., it is the third, the fourth, the fifth, and the seventh which are discords.

‖ This chord is known as that of the second, or the third derivative of the minor seventh.

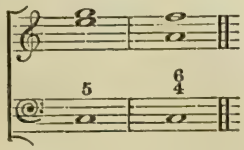
Ex. 145.

First inversion, chord of the sixth:—



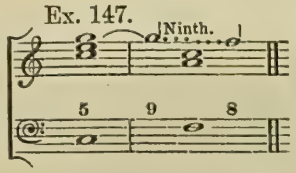
Ex. 146.

Second inversion, chord of the six-four:—



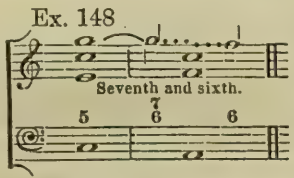
Ex. 147.

Discord of a ninth, retarding the octave in the common chord:—



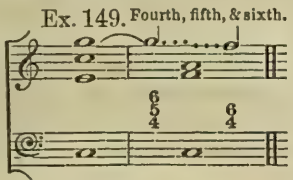
Ex. 148

Discord of a seventh, retarding the octave of the sixth in the chord of the sixth:—



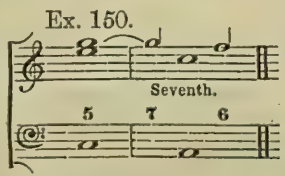
Ex. 149. Fourth, fifth, & sixth.

Discord of a fifth, retarding the octave of the fourth in the chord of the six-four:—



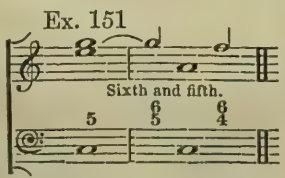
Ex. 150.

Discord of a seventh, retarding the sixth in the chord of the sixth:—



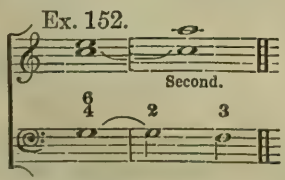
Ex. 151

Discord of a fifth, retarding the fourth in the chord of the six-four:—



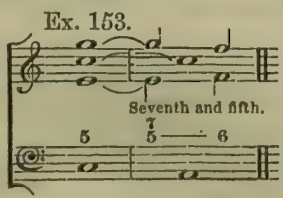
Ex. 152.

Discord of a second, retarding the common chord:—



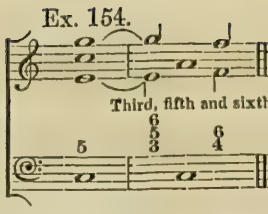
Ex. 153.

Double discord of a fifth and seventh, retarding the sixth in the chord of the sixth:—



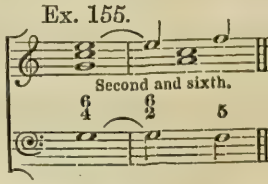
Ex. 154.

Double discord of a third and fifth, retarding the fourth in the chord of the six-four:—



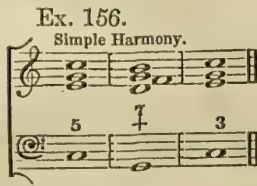
Ex. 155.

Double discord of a second and sixth, retarding the fundamental note, and the octave in the common chord:—



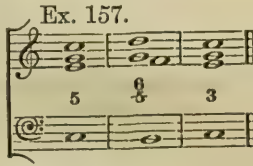
Ex. 156.

Example of the dominant seventh and its three inversions:—



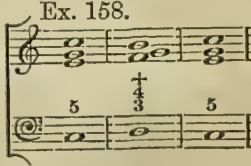
Ex. 157.

First inversion. Chord of the sixth and diminished fifth:—



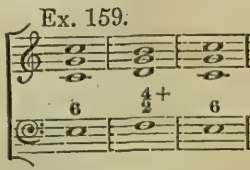
Ex. 158.

Second inversion. Chord of the little sharp sixth:—



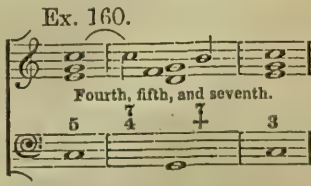
Ex. 159.

Third inversion. Chord of the tritone:—



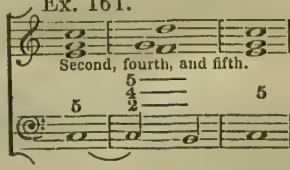
Ex. 160.

Discord of a fourth, retarding the third in the chord of the dominant seventh:—



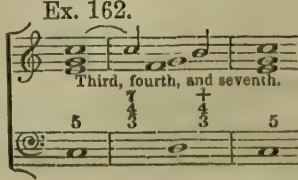
Ex. 161.

Discord of a second, retarding the chord of the diminished fifth and sixth:—



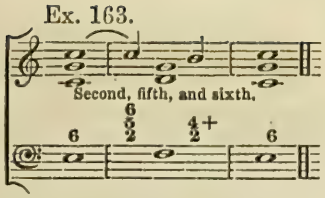
Ex. 162.

Discord of a seventh, retarding the sixth in the chord of the imperfect seventh:—



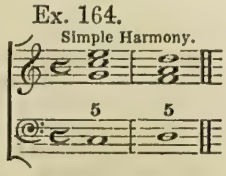
Ex. 163.

Discord of a fifth, retarding the fourth in the chord of the tritone :—



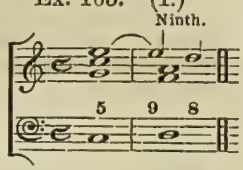
Ex. 164.

In this example, the second chord is a minor common chord :—



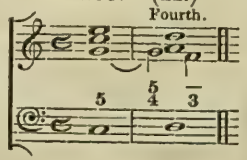
Ex. 165. (I.)

Discord of a ninth, retarding the octave in the common chord :—



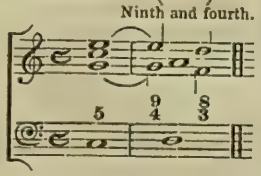
Ex. 166. (II.)

Discord of a fourth, retarding the third in the common chord :—



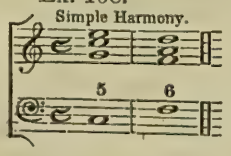
Ex. 167. (III.)

Double discord of a ninth and a fourth, retarding the octave and the third in the common chord :—



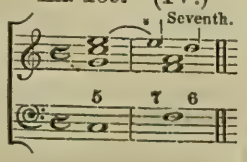
Ex. 168.

In this example, the second chord is a simple chord of the sixth :—



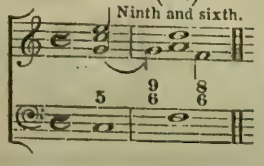
Ex. 169. (IV.)

Discord of a seventh, retarding the sixth in the chord of the sixth :—



Ex. 170. (V.)

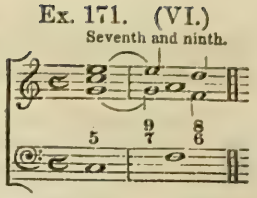
Discord of a ninth, retarding the octave in the chord of the sixth :—



* This chord is known as that of the major seventh.

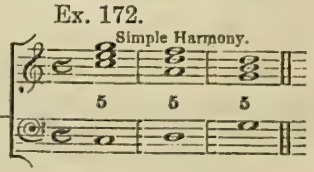
Ex. 171. (VI.)

Double discord of a seventh and ninth, retarding the sixth and the octave in the chord of the sixth :—



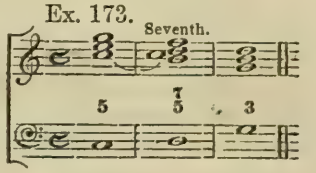
Ex. 172.

In this example, the second chord is a minor common chord :—



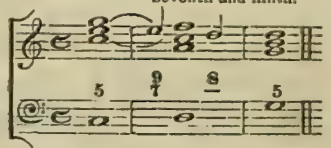
Ex. 173.

Discord of a seventh on the common chord :—



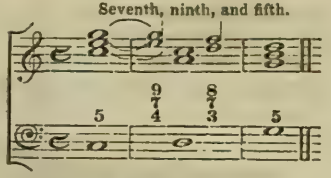
Ex. 174.

Double discord of a seventh on the common chord and of a ninth, retarding the octave :—



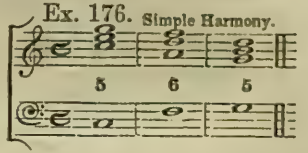
Ex. 175.

Triple discord of a seventh on the common chord, and of a ninth and fourth, retarding the octave and the third :—



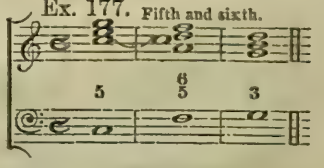
Ex. 176.

Chord of the sixth at the second bar :—



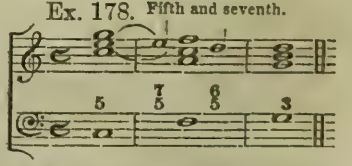
Ex. 177.

Discord of a fifth in the chord of the sixth :—



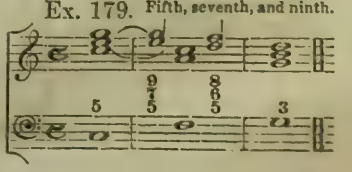
Ex. 178.

Double discord of a fifth in the chord of the sixth, and of a seventh, retarding the sixth :—



Ex. 179.

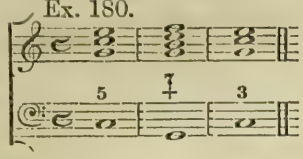
Triple discord of a fifth in the chord of the sixth, and of a seventh and ninth, retarding the sixth and the octave :—



The chords of the dominant seventh, the imperfect seventh, and the diminished seventh, may be wholly prolonged on the tonic and on the mediant.

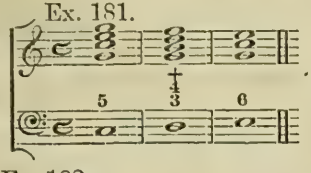
Ex. 180.

The chord of the dominant seventh, followed by the tonic, carrying the common chord :—



Ex. 181.

Second inversion of the dominant seventh, followed by the mediant, carrying the chord of the sixth :—



Ex. 182.

Prolongation of the dominant seventh on the tonic, retarding the common chord:—



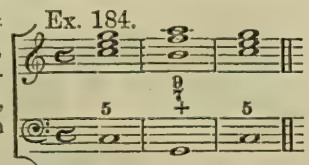
Ex. 183.

Prolongation of the dominant seventh on the mediant, retarding the chord of the sixth :—



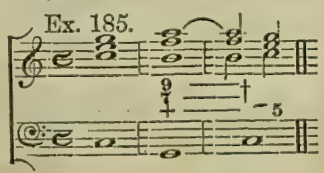
Ex. 184.

Chord of the imperfect seventh on the dominant, or dominant ninth, followed by the tonic, carrying the common chord :—



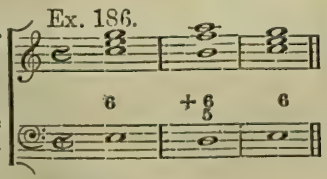
Ex. 185.

Prolongation of the imperfect seventh on the tonic, retarding the common chord :—



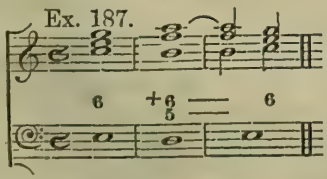
Ex. 186.

First inversion of the imperfect seventh, followed by the mediant, carrying the chord of the sixth :—



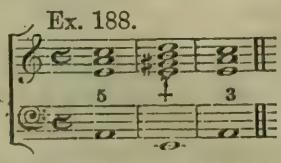
Ex. 187.

Prolongation of the imperfect seventh, on the mediant, retarding the chord of the sixth :—



Ex. 188.

Chord of the dominant seventh, followed by the tonic in the minor mode :—

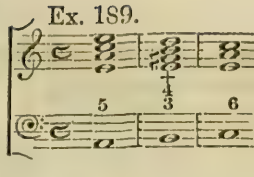


* This chord is known as that of the superfluous seventh, or eleventh on the tonic.

† This chord is known as that of the superfluous seventh, and major sixth, or thirteenth on the tonic.

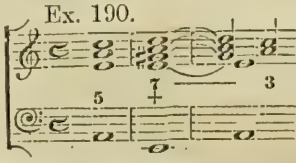
Ex. 189.

Second inversion of the dominant seventh, followed by the mediant, carrying the chord of the sixth :—



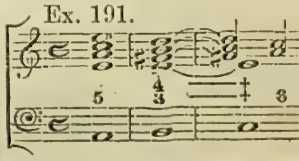
Ex. 190.

Prolongation of the dominant seventh on the tonic, retarding the common chord :—



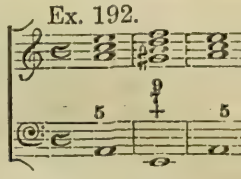
Prolongation of the dominant seventh on t
mediant, retarding the chord of the sixth.
this prolongation, the mediant forms, with the leading note, the interval of an extreme sharp fifth :—

Ex. 191.



Ex. 192.

Chord of the diminished seventh on the dominant, or dominant minor ninth, followed by the tonic :—



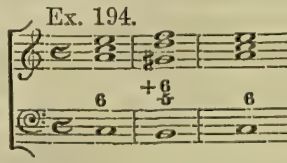
Ex. 193

Prolongation of the diminished seventh on the tonic, retarding the common chord :—



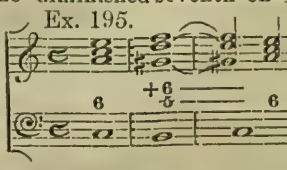
Ex. 194.

First inversion of the diminished seventh, followed by the mediant, carrying the chord of the sixth :—



Prolongation of the diminished seventh on t
mediant, retarding the chord of the sixth. This prolongation also presents the interval of the extreme sharp fifth :—

Ex. 195.

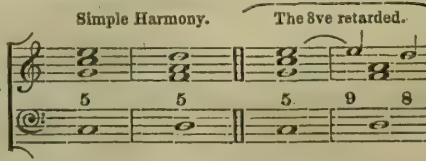


Examples of all the progressions in the ba
together with the natural chords, and the p
longations, which may be introduced.

The bass ascends by a second :—

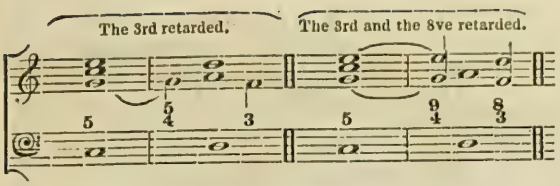
Simple Harmony. The 8ve retarded.

Ex. 196.

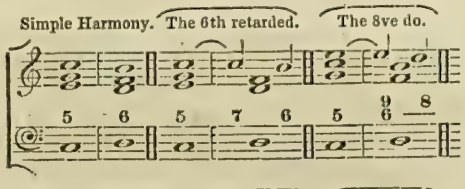


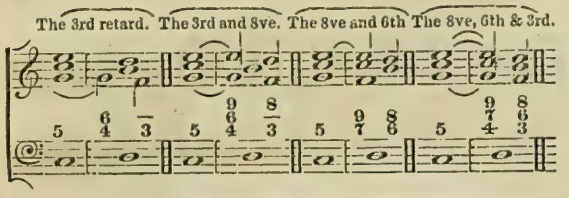
‡ This chord is known as that of the superfluous fifth.

§ This chord is known as that of the superfluous seventh and m
sixth, or thirteenth on the tonic.

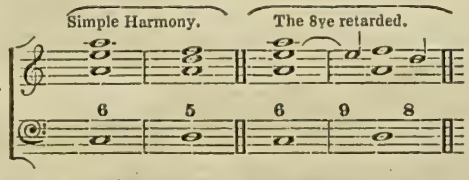


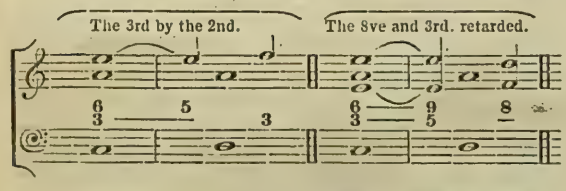
Ex. 197.



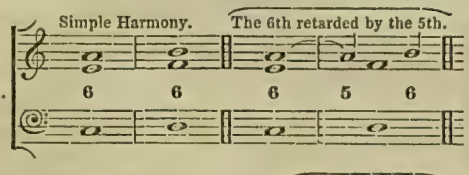


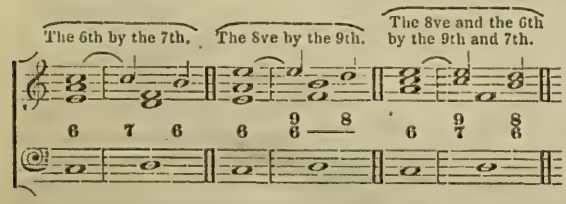
Ex. 198.



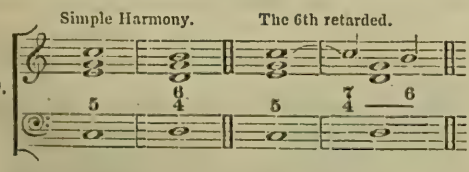


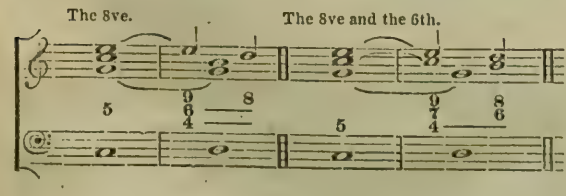
Ex. 199.



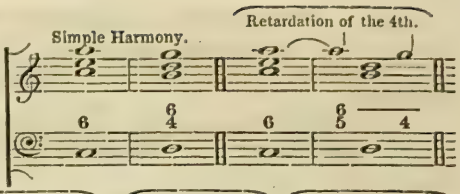


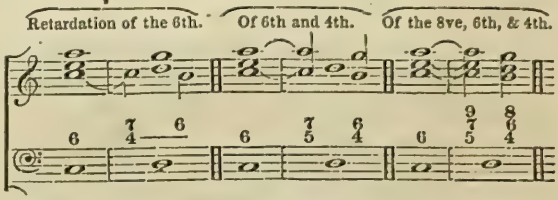
Ex. 200.





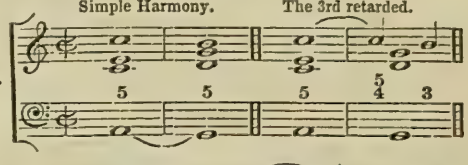
Ex. 201.

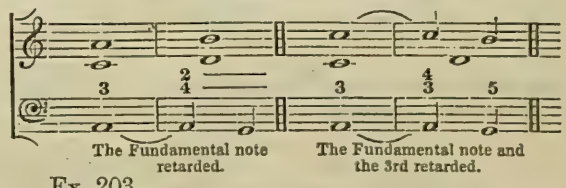




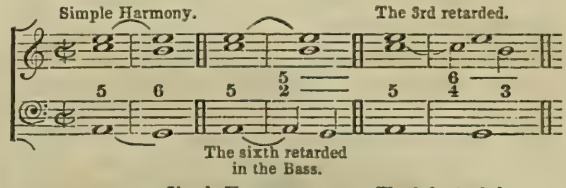
The bass descends by a second :—

Ex. 202.

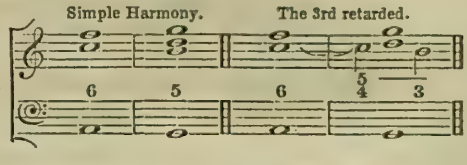


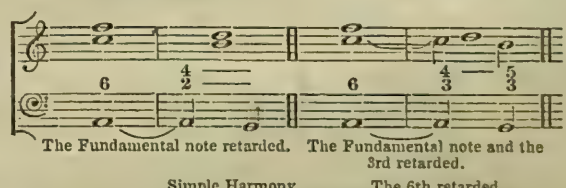


Ex. 203.

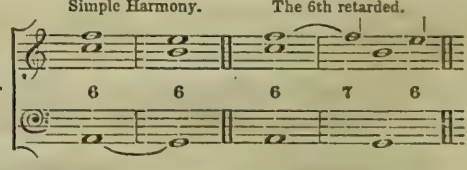


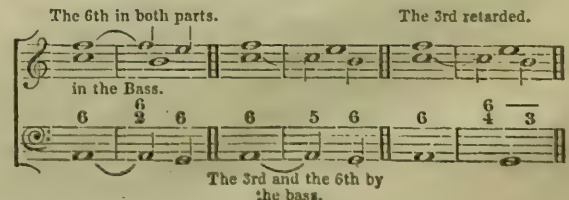
Ex. 204.



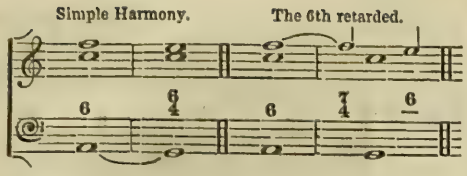


Ex. 205.



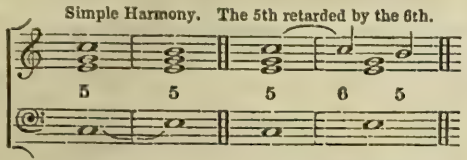


Ex. 206.

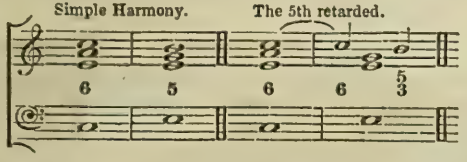


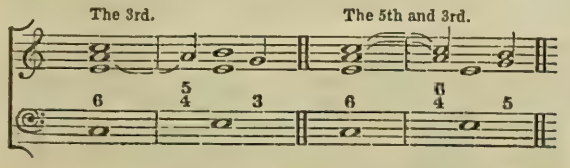
The bass ascends by a third :—

Ex. 207.



Ex. 208.



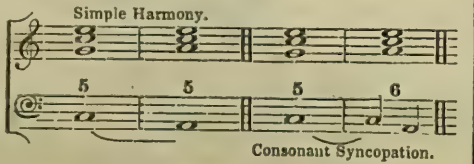


Ex. 209.

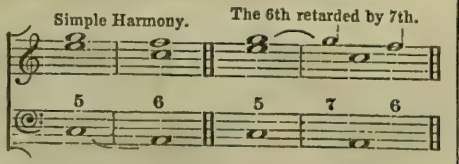


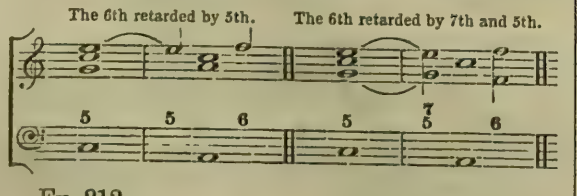
The bass descends by a third :—

Ex. 210.

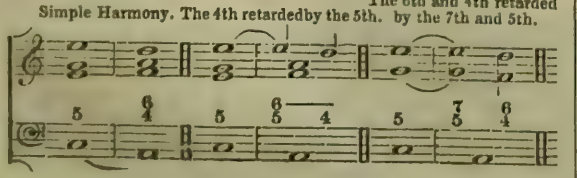


Ex. 211.



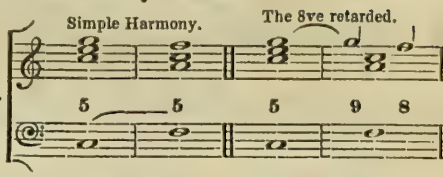


Ex. 212.

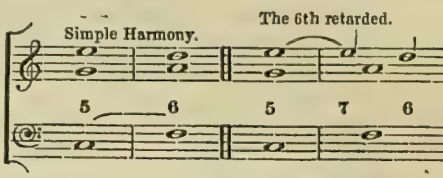


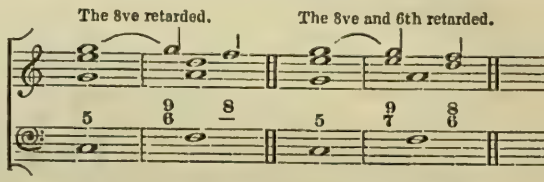
The bass ascends by a fourth :—

Ex. 213.

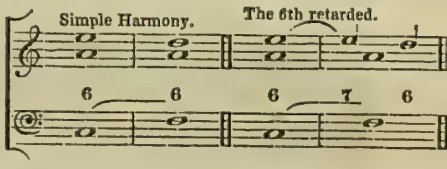


Ex. 214.



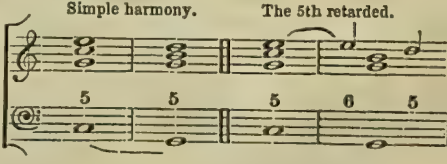


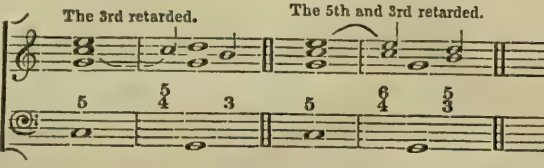
Ex. 215.



The bass descends by a fourth :—

Ex. 216.





ARTICLE VIII.

Cadences.

A cadence is the termination of a musical phrase on a repose. The resolution of a discord into a concord is also called a cadence.

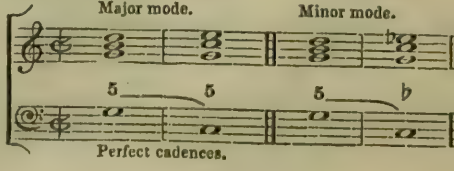
There are two principal cadences :—the cadence on the tonic, and the cadence on the dominant.

The cadence on the tonic concludes the sense of the musical phrase, and is called final or perfect cadence.

The cadence on the dominant suspends the sense of the musical phrase without concluding it.

The perfect cadence consists of the chord of the dominant resolved on the tonic :—

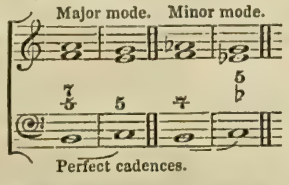
Ex. 217.





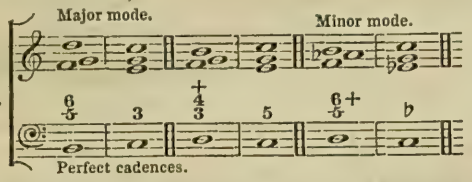
The resolution of the imperfect seventh, and of the diminished seventh on the tonic, is also a perfect cadence; but it is rarely employed as a final cadence :—

Ex. 218.



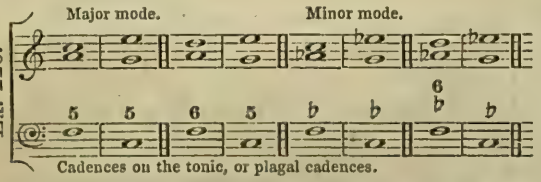
The inversions of the dominant seventh and of the diminished seventh, resolved on the tonic, form also perfect cadences :—

Ex. 219.



The cadence on the tonic may also be introduced by the subdominant, carrying the common chord, or chord of the sixth :—

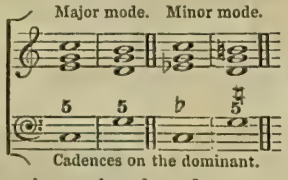
Ex. 220.



This cadence does not terminate the sense of the musical phrase as the perfect cadence does; nevertheless, it is occasionally used as a conclusion in music of the sacred style. It is called a plagal cadence.

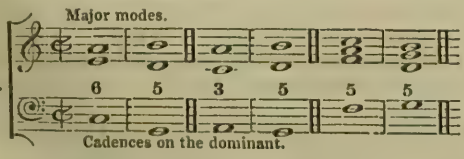
Ex. 221.

The cadence on the dominant is the transition of the tonic, while resting on the dominant :—

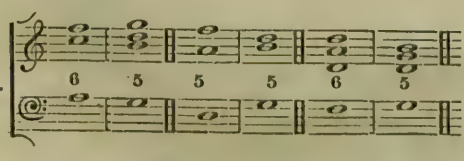


The cadence on the dominant is also the transition of every chord, while resting on the dominant; it is not a final repose, and merely serves to suspend the sense of a musical phrase :—

Ex. 222.

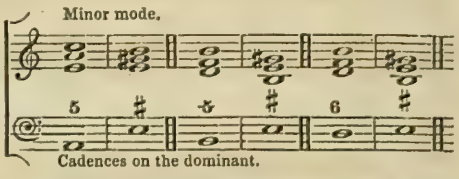


Ex. 223.

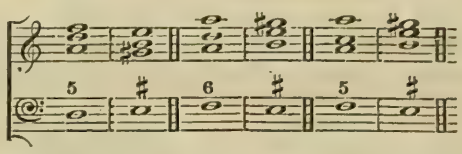


In the minor mode, the repose (or pause) on the dominant, always takes place on the major common chord :—

Ex. 224.

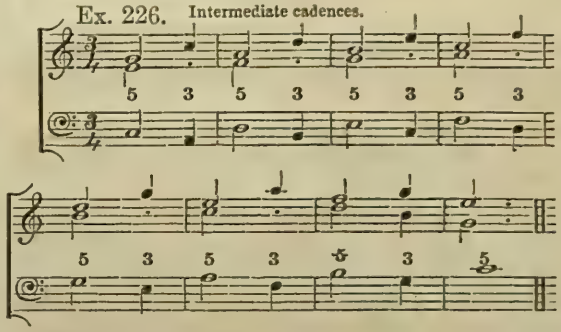


Ex. 225.



A momentary repose (or pause) may take place on each of the other notes of the scale, as an intermediate cadence, before reaching one of the two principal cadences :—

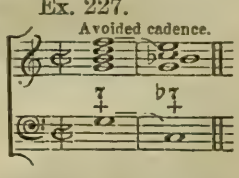
Ex. 226. Intermediate cadences.



The perfect cadence may be avoided, interrupted, or broken, by changing the resolution of the dominant seventh, which announces that cadence.

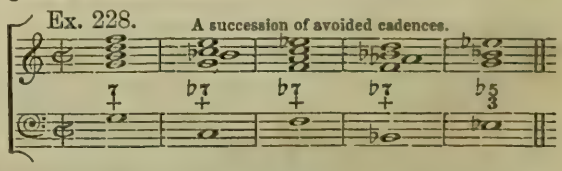
The cadence is avoided, by adding the minor seventh to the major common chord, upon which the pause was to have taken place; that is to say, by altering the tonic into a dominant seventh, which produces two successive dominant sevenths, descending by fifths :—

Ex. 227.



This cadence may continue to be avoided, and a series of dominant sevenths descending by fifths be given in succession :—

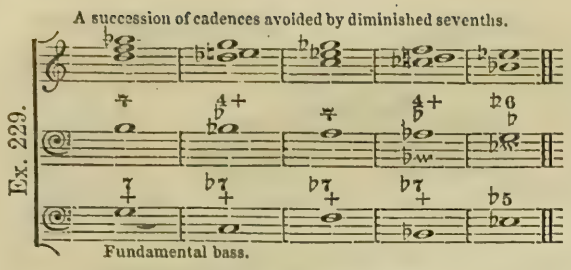
Ex. 228. A succession of avoided cadences.



It should be observed, that the key changes each time one dominant succeeds another.

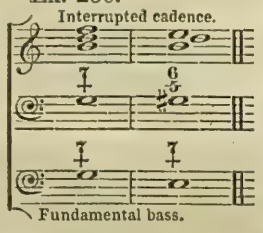
In the minor mode, the succession of dominant sevenths is effected as in the major mode; but the diminished sevenths produced by these dominants may be substituted, taking care that all the parts shall descend by semitones (see Article X. on Genera, p. 35) :—

Ex. 229.



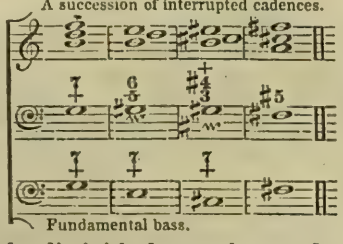
The perfect cadence is interrupted by causing the dominant seventh, that announces the cadence, to be followed by another dominant seventh, the fundamental note of which shall form a third below the first seventh :—

Ex. 230.



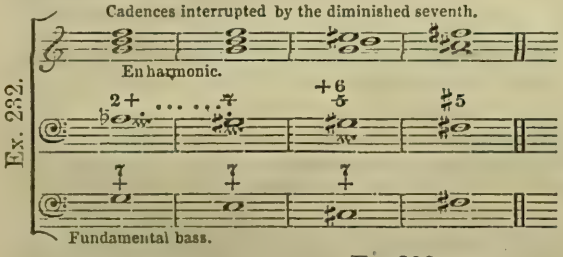
The interruption of the cadence may be continued, and a succession of dominant sevenths be given, the fundamental sound of each of which shall descend by a third :—

Ex. 231.



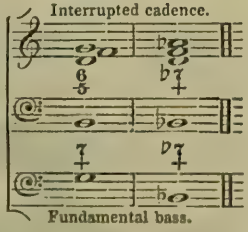
In the minor mode, diminished sevenths may be used instead of dominant sevenths : this succession conveys the enharmonic genus (see Article X. on Genera, p. 35) :—

Ex. 232.



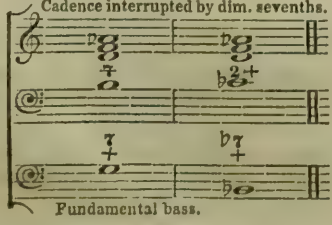
The perfect cadence may also be interrupted, by causing the dominant seventh to be followed by another dominant seventh, the fundamental note of which shall be a third above the former one :—

Ex. 233.



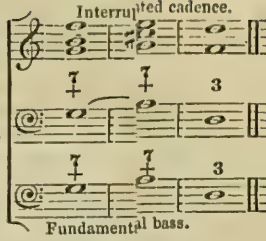
In the minor mode diminished sevenths may be employed instead of dominant sevenths :—

Ex. 234.



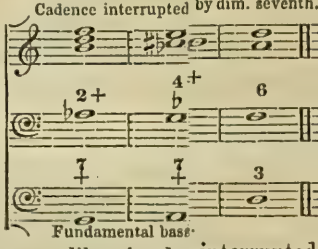
The perfect cadence may otherwise be interrupted by causing the dominant seventh to be followed by another dominant seventh, the fundamental note of which shall be a second above the former one :—

Ex. 235.



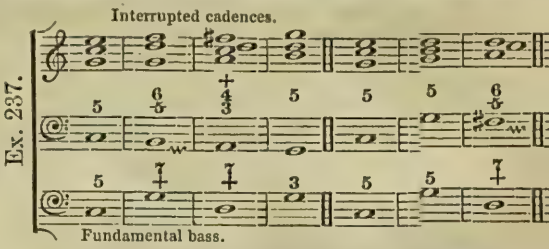
In the minor mode, diminished sevenths may be used instead of dominant sevenths :—

Ex. 236.



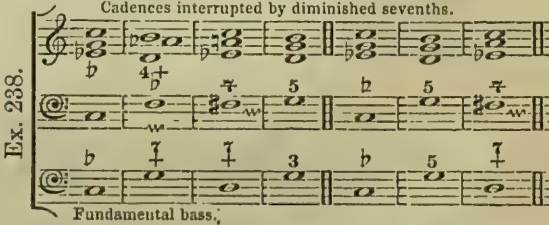
The perfect cadence may likewise be interrupted by causing the dominant seventh to be followed by another dominant seventh, the fundamental note of which shall be a fourth below the former one :—

Ex. 237.



In the minor mode diminished sevenths may be employed instead of dominant sevenths :—

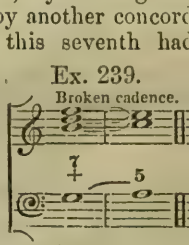
Ex. 238.



The perfect cadence is broken, by causing the dominant seventh to be followed by another concord than that of the tonic, which this seventh had announced.

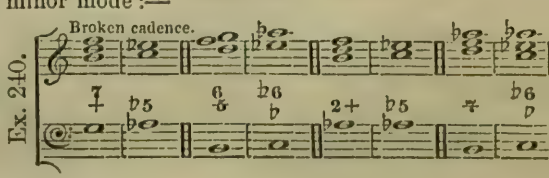
Cadence broken by the common chord on the sixth note. This method of breaking the cadence is most generally used ; it is the one meant by the simple expression, "BROKEN CADENCE :"—

Ex. 239.



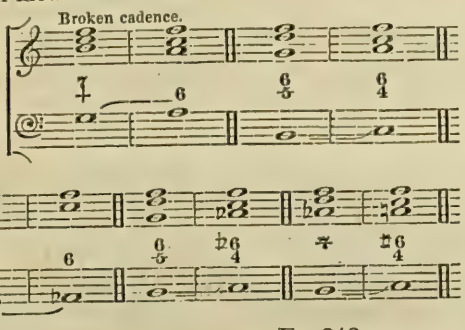
There are different modes of employing it in the minor mode :—

Ex. 240.



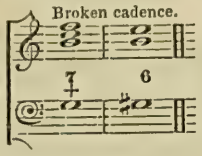
Cadence broken by the chord of the sixth on the sixth note; and the different methods of employing it in both modes :—

Ex. 241.



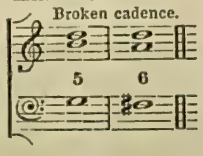
Ex. 242.

Cadence broken by the chord of the sixth on the dominant, altered into the leading note of the relative minor :—



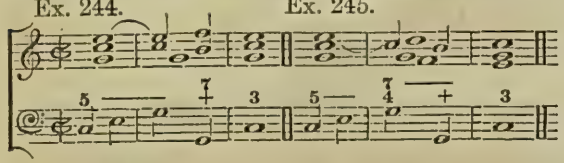
Ex. 243.

Cadence broken by the chord of the sixth on the fourth note, altered into the leading note of the dominant :—

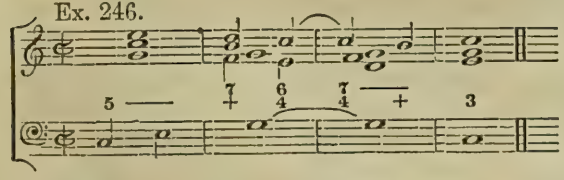


Examples of the most usual progressions in the bass, wherewith to introduce perfect cadences :—

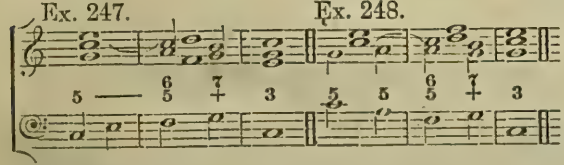
Ex. 244. Ex. 245.



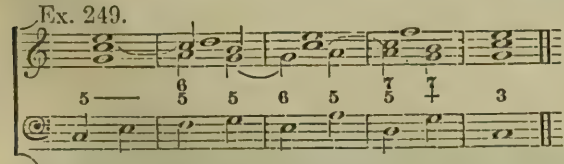
Ex. 246.



Ex. 247. Ex. 248.



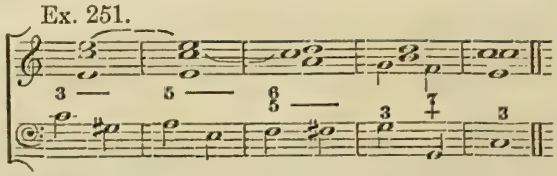
Ex. 249.



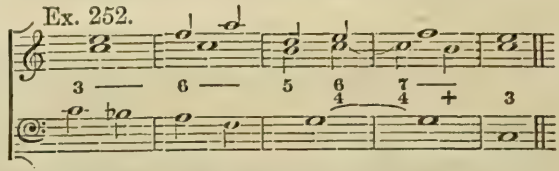
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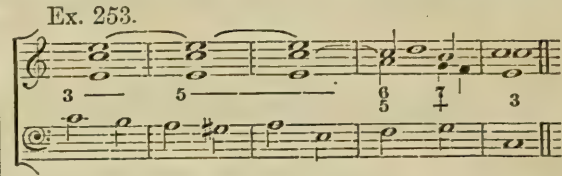
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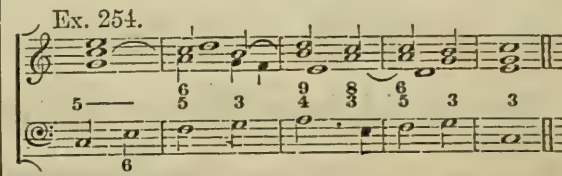
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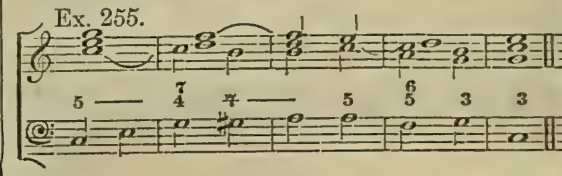
Ex. 253.



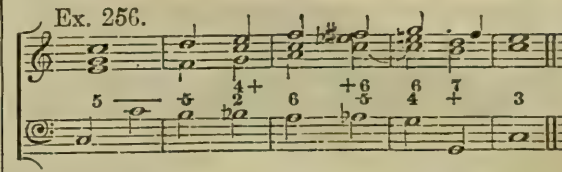
Ex. 254.



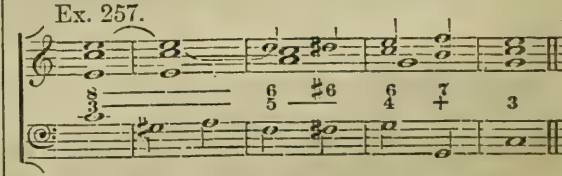
Ex. 255.



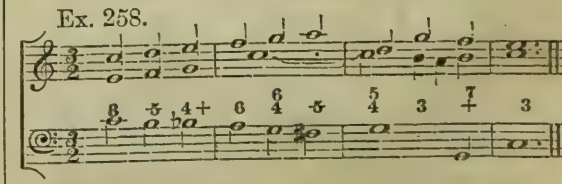
Ex. 256.



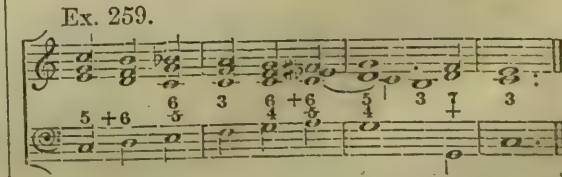
Ex. 257.



Ex. 258.



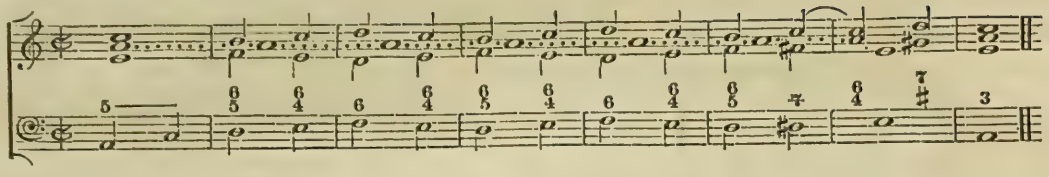
Ex. 259.



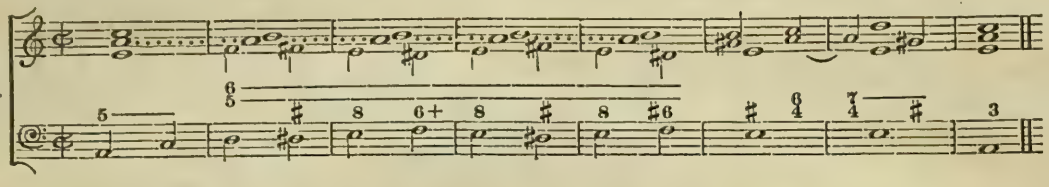
The preceding examples may be applied to the minor mode.

Other examples in the minor mode :—

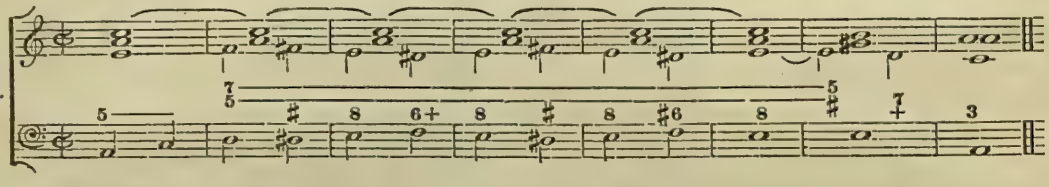
Ex. 260.



Ex. 261.

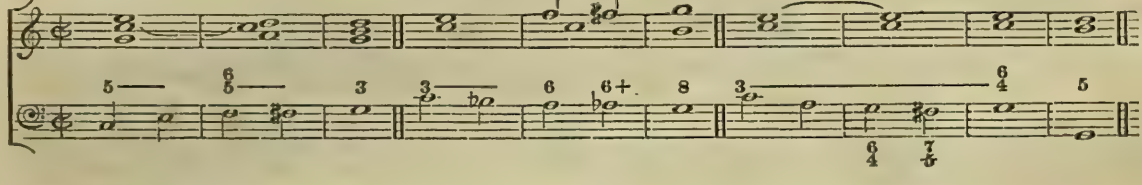


Ex. 262.



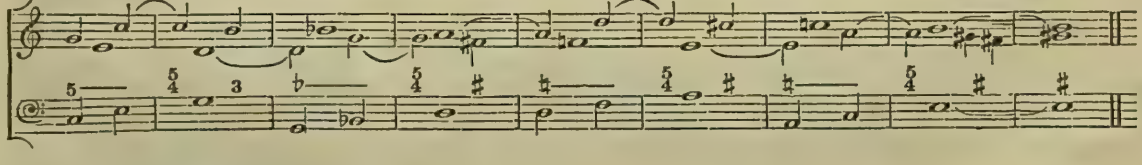
Progressions of the bass to bring in a repose (or pause) on the dominant :—

Ex. 263. Ex. 264. Ex. 265.



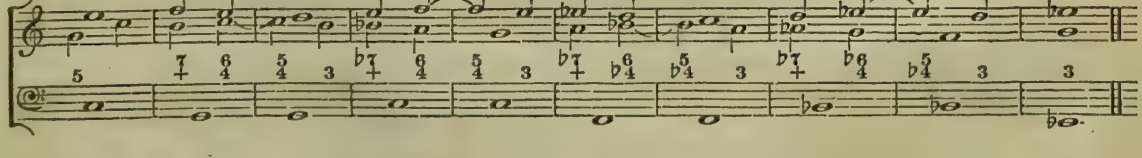
A series of cadences on the dominant :—

Ex. 266.



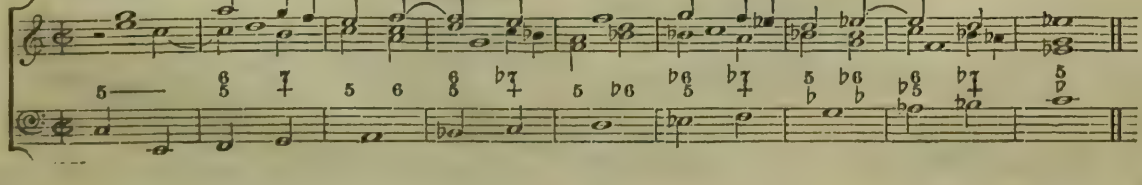
A series of avoided cadences :—

Ex. 267.



A series of broken cadences :—

Ex. 268.

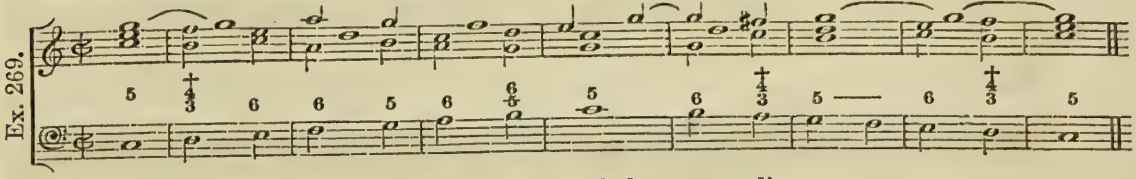


ARTICLE IX.

THE DIFFERENT PROCEDURES OF THE BASS THROUGHOUT THE EXTENT OF THE DIATONIC SCALE; WITH THE NATURAL HARMONY, AND THE DISSONANT PROGRESSIONS, MOST IN USE.

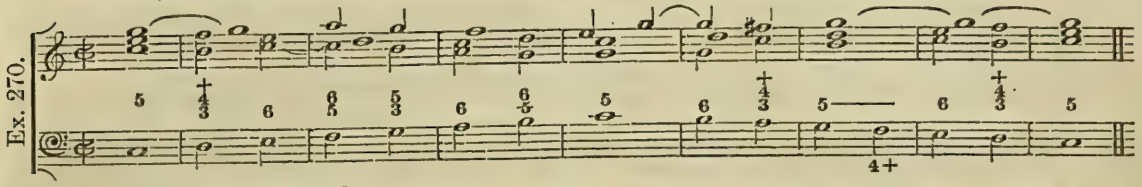
Rule of the octave in the major mode, with the single natural chords :—

Ex. 269.



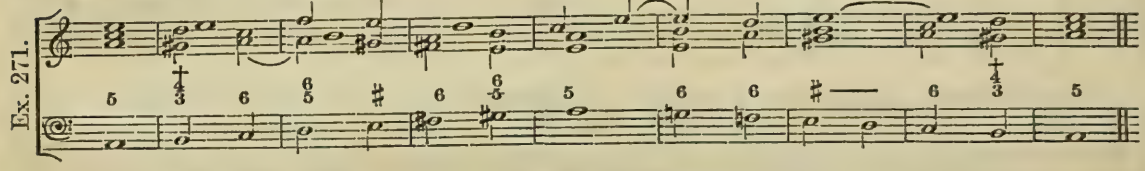
The same, with the discord of the fifth on the fourth degree ascending :—

Ex. 270.



The same in the minor mode :—

Ex. 271.



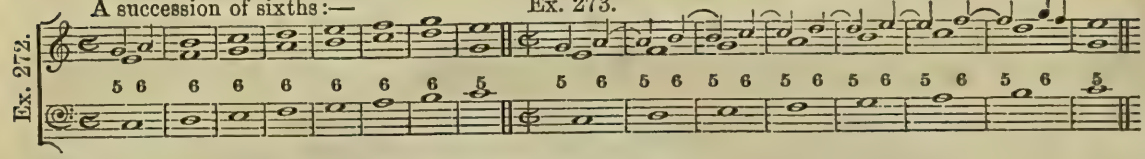
SIMPLE HARMONY.

A succession of sixths :—

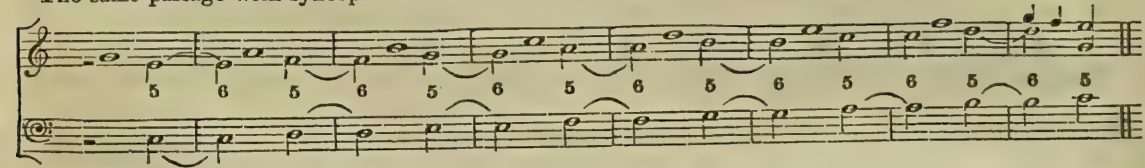
The sixths retarded by fifths :—

Ex. 273.

Ex. 272.

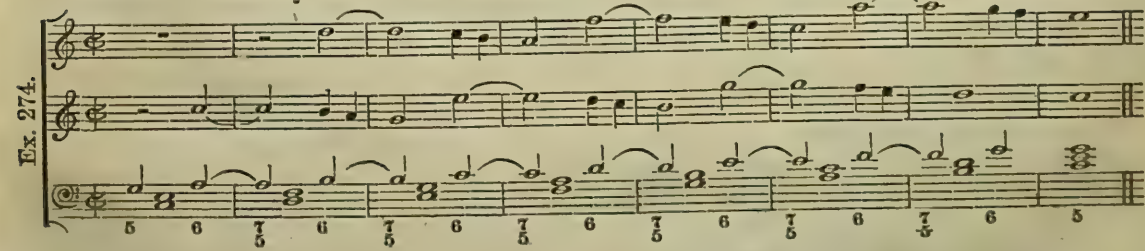


The same passage with syncopations :—



The sixths retarded by the fifths and sevenths, producing a succession of sevenths :—

Ex. 274.

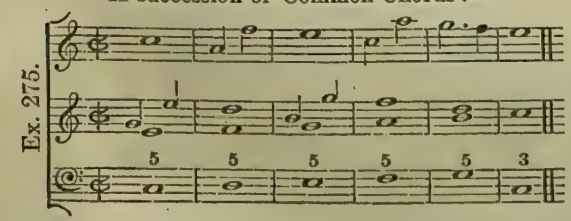


SIMPLE HARMONY.

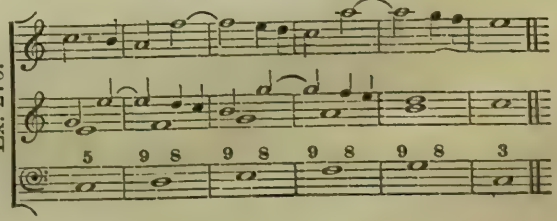
A succession of Common Chords :—

Retardation of the octave, producing a succession of ninths :—

Ex. 275.

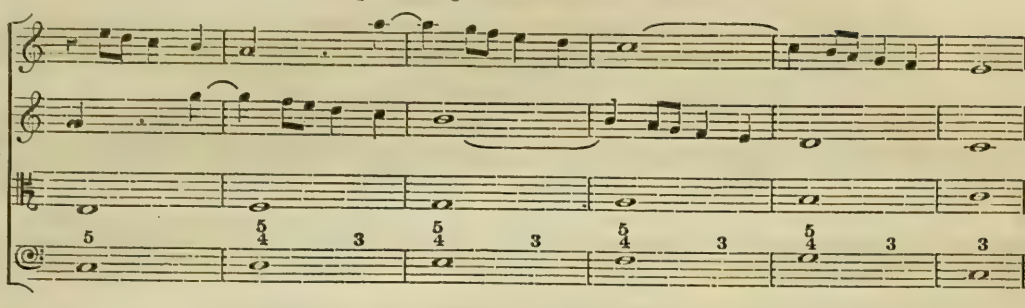


Ex. 276.



Retardation of the octave of the third, producing a succession of elevenths :—

Ex. 277.

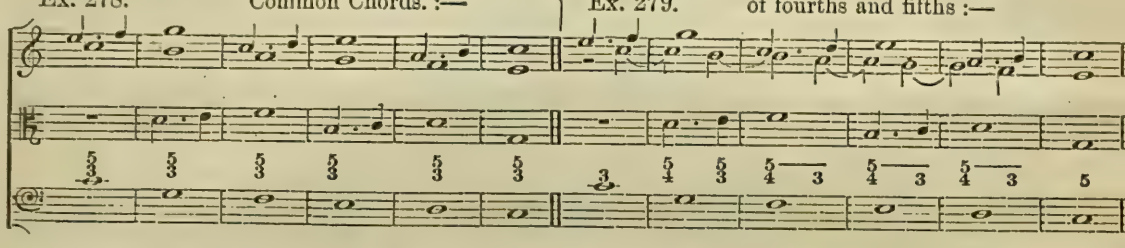


Simple Harmony. A succession of Common Chords. :—

Ex. 278.

Retardation of thirds, producing a succession of fourths and fifths :—

Ex. 279.

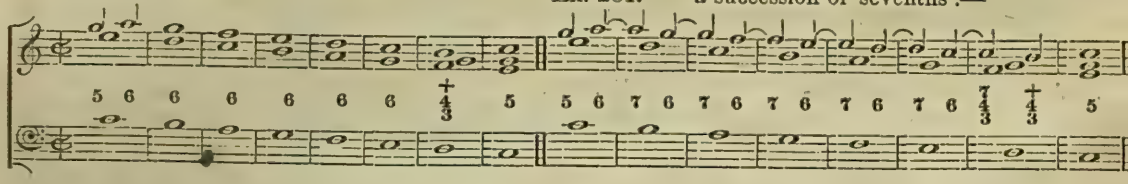


Simple Harmony. A succession of sixths :—

Ex. 280.

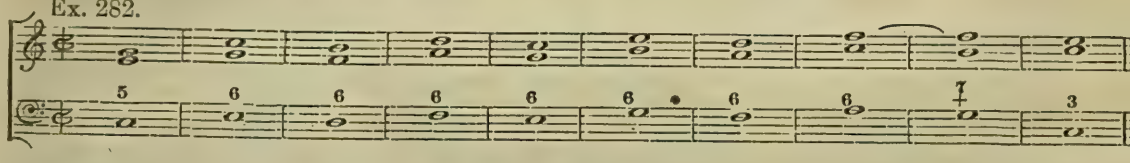
The sixths retarded by sevenths, producing a succession of sevenths :—

Ex. 281.



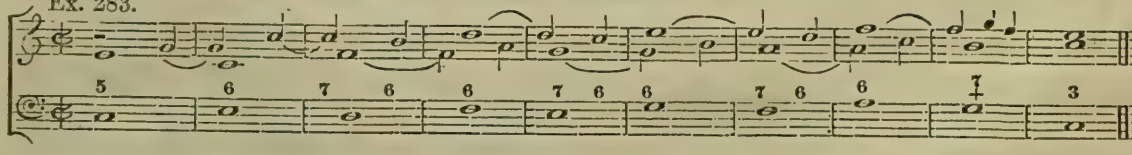
Simple Harmony. A succession of sixths :—

Ex. 282.



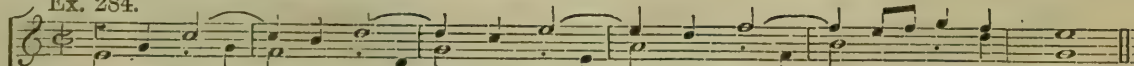
The sixths retarded by sevenths, when the bass descends a second :—

Ex. 283.



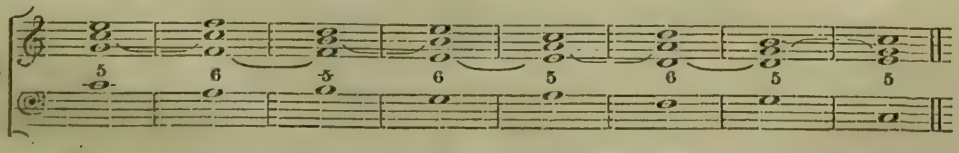
The same passage more close :—

Ex. 284.



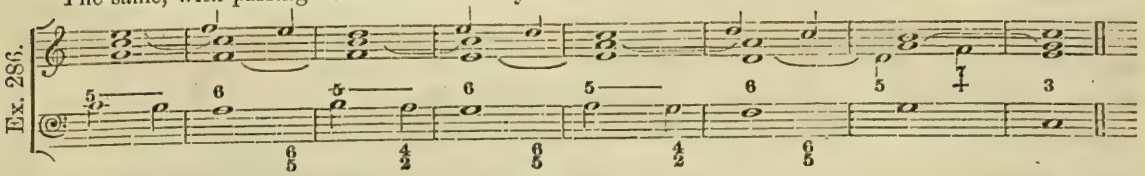
Simple Harmony. A succession of common chords and sixths :—

Ex. 285.



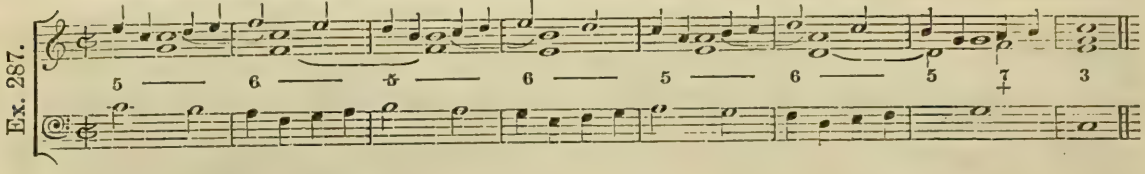
The same, with passing notes in the melody and bass :—

Ex. 286.



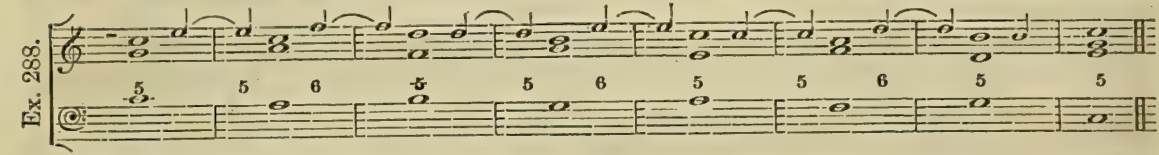
The same, differently treated :—

Ex. 287.



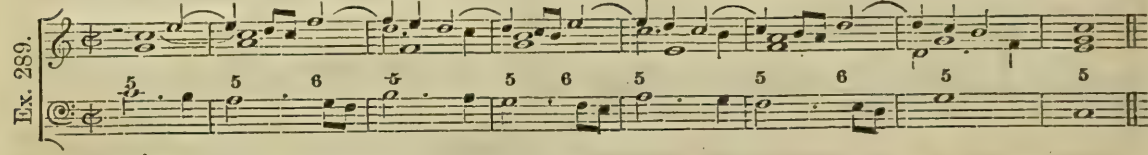
The sixths retarded by fifths :—

Ex. 288.



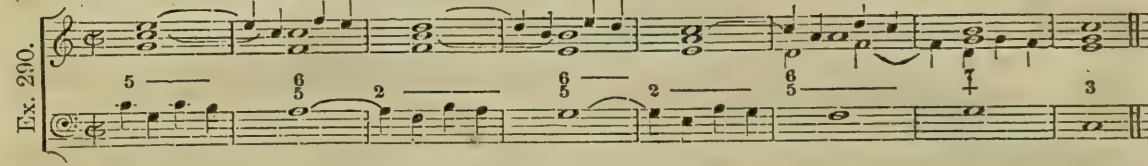
The same passage made more florid :—

Ex. 289.



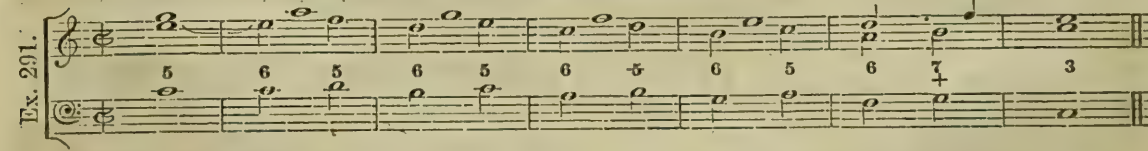
Succession of fifths, sixths, and seconds :—

Ex. 290.



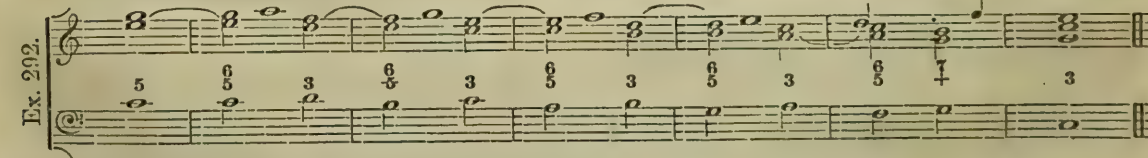
Simple Harmony. Succession of sixths and common chords :—

Ex. 291.



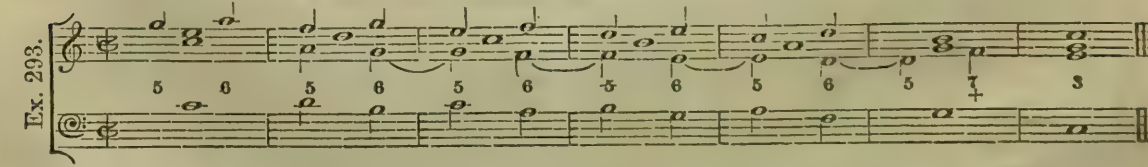
The discord of a fifth in the chord of the sixth, producing a succession of fifths and sixths :—

Ex. 292.



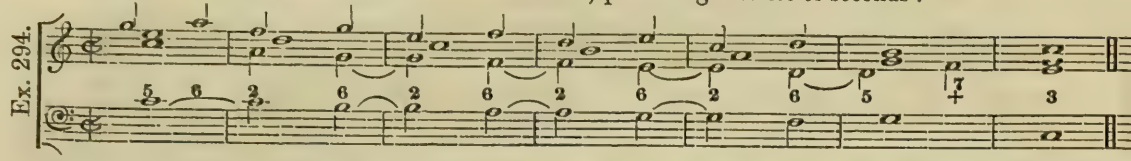
Simple Harmony. A succession of common chords and sixths :—

Ex. 293.



The discord of a second under the common chord, producing a series of seconds :—

Ex. 294.



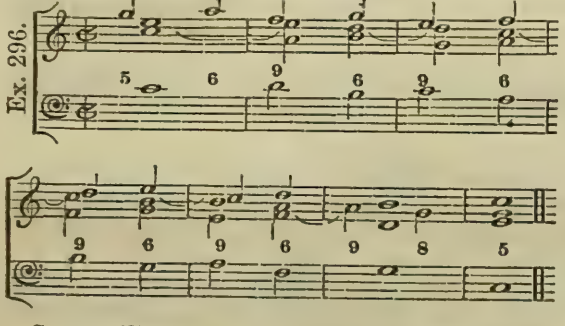
The discord of a second under the common chord, and of a fifth in the chord of the sixth, producin a succession of seconds, sixths, and fifths :—

Ex. 295.



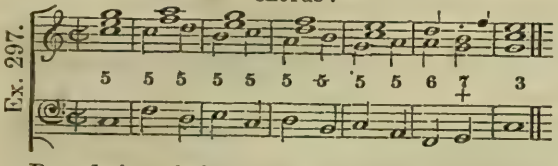
Retardation of the octave in the common chord, producing a succession of ninths :—

Ex. 296.



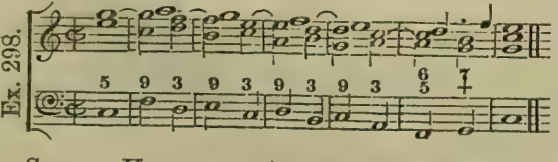
Simple Harmony. A succession of common chords :—

Ex. 297.



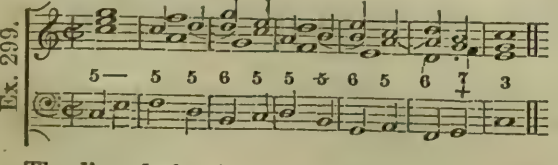
Retardation of the octave, producing a succession of ninths :—

Ex. 298.



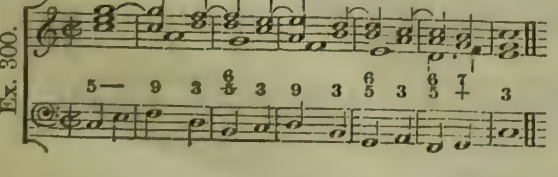
Simple Harmony. A succession of common chords and sixths :—

Ex. 299.



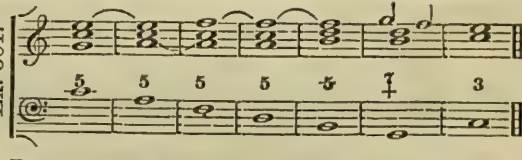
The discord of a ninth on the common chord, and of a fifth in the chord of the sixth :—

Ex. 300.



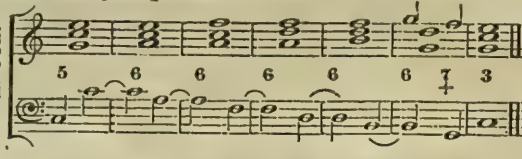
Simple Harmony. A succession of commo chords :—

Ex. 301.



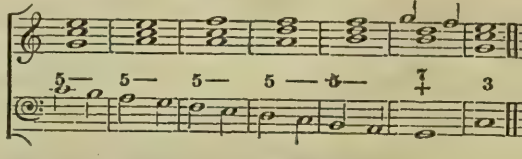
Retardation of the bass, producing a succession o consonant syncopations :—

Ex. 302.



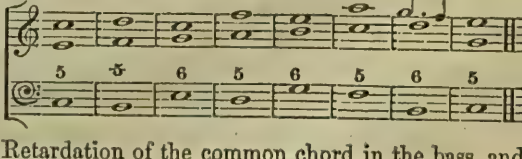
The interval of a third in the bass, filled up by passing note :—

Ex. 303.



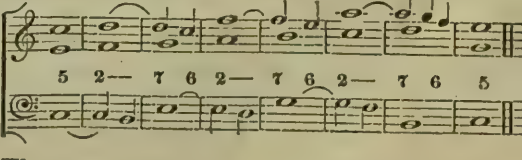
Simple Harmony. A succession of commo chords and sixths :—

Ex. 304.



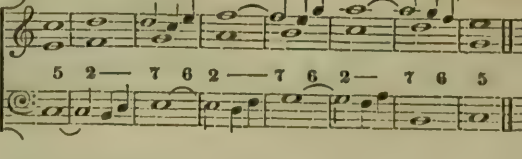
Retardation of the common chord in the bass, and of the sixth in the melody, producing a succession o seconds and sevenths :—

Ex. 305.



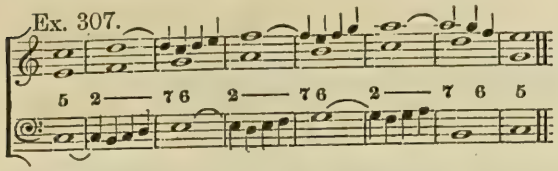
The same passage :—

Ex. 306.



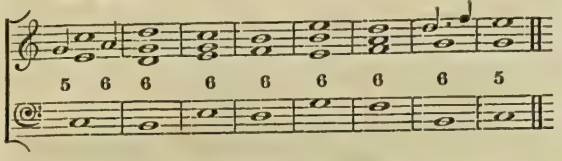
The same passage, in which the leap of a fourth is filled up :—

Ex. 307.



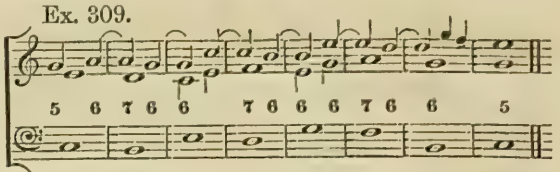
Simple Harmony. A succession of sixths :—

Ex. 308.



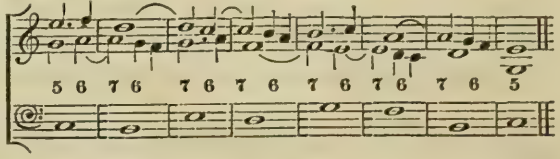
Retardation of the sixth, causing a succession of sevenths at every other bar :—

Ex. 309.



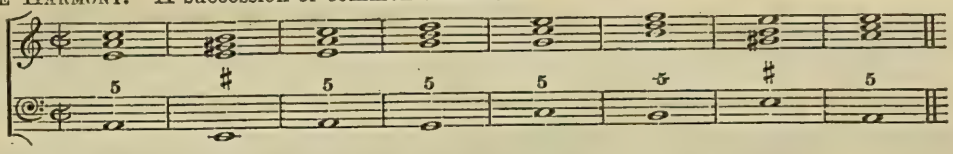
Retardation of the sixth, causing a succession of sevenths at every bar :—

Ex. 310.



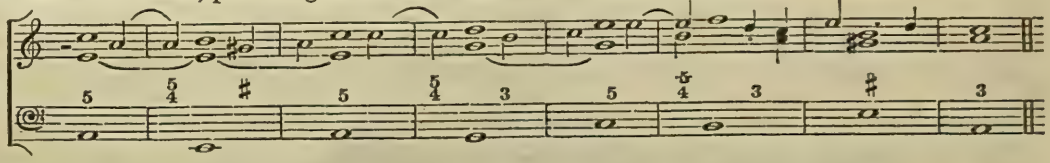
Simple Harmony. A succession of common chords :—

Ex. 311.



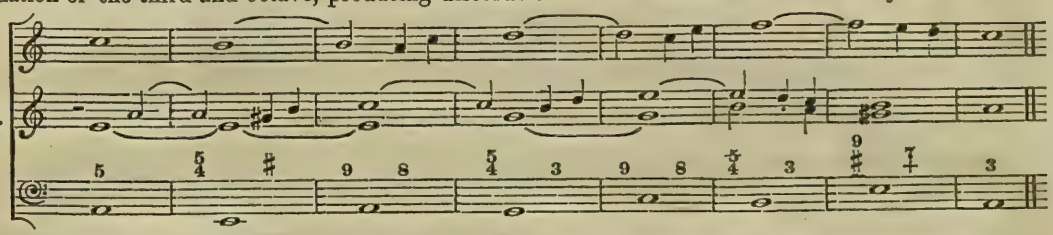
Retardation of the third, producing a discord of the fourth at every other bar :—

Ex. 312.



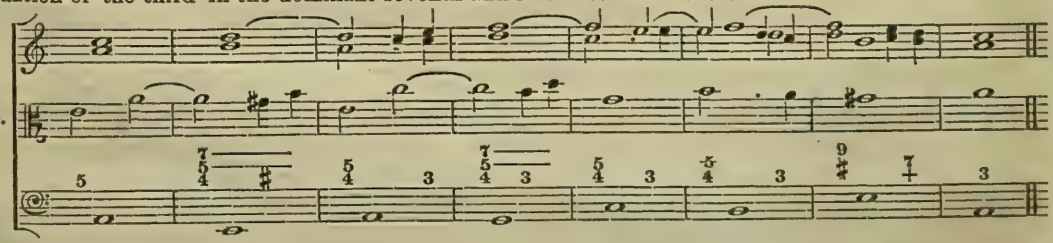
Retardation of the third and octave, producing discords of the fourth and ninth alternately :—

Ex. 313.



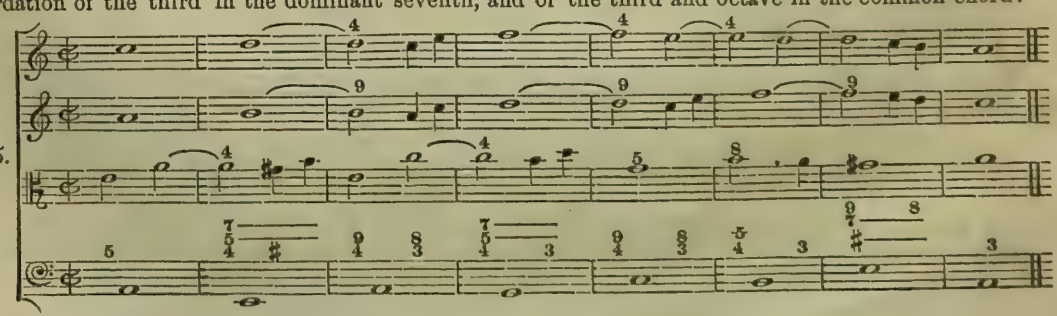
Retardation of the third in the dominant seventh and in the common chord :—

Ex. 314.



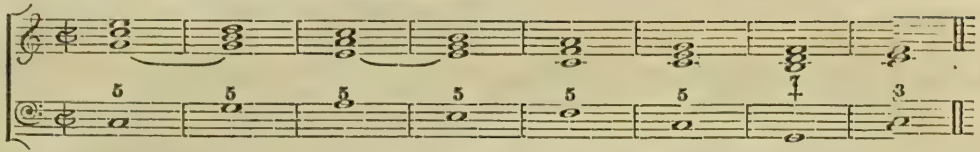
Retardation of the third in the dominant seventh, and of the third and octave in the common chord :—

Ex. 315.



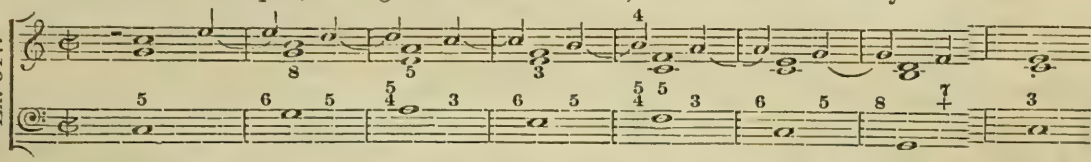
Simple Harmony. A succession of common chords:—

Ex. 316.



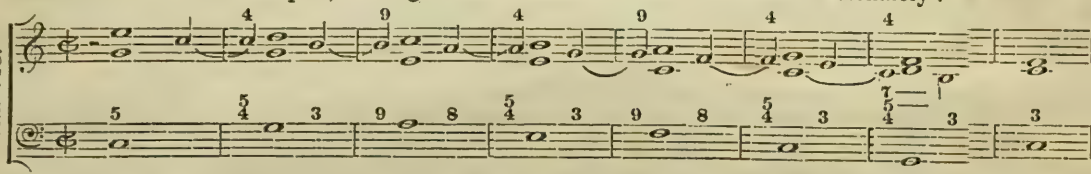
Retardation of the first part, making a succession of sixths, and five-fours alternately:—

Ex. 317.



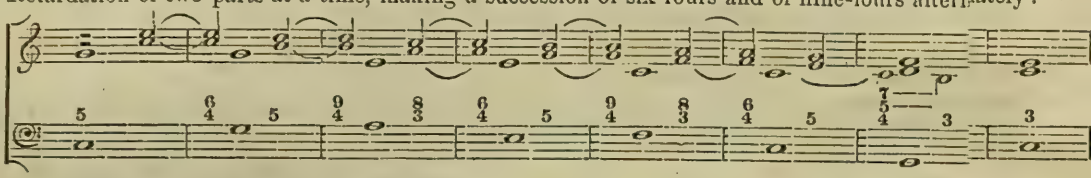
Retardation of the second part, making a succession of five-fours and ninths alternately:—

Ex. 318.



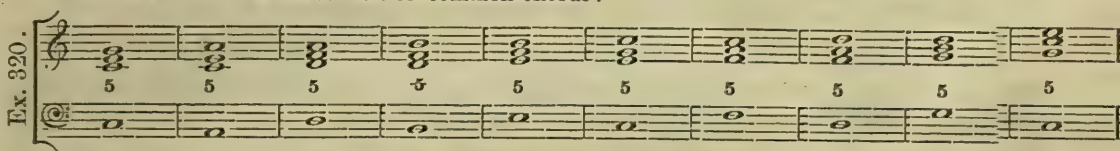
Retardation of two parts at a time, making a succession of six-fours and of nine-fours alternately:—

Ex. 319.



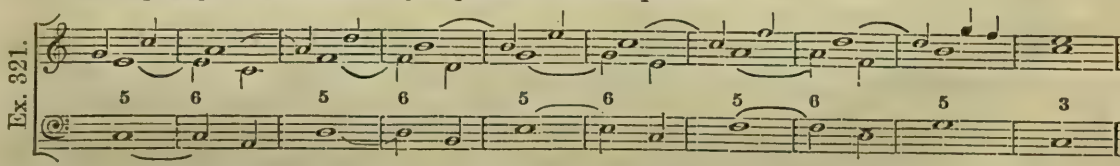
Simple Harmony. A succession of common chords:—

Ex. 320.



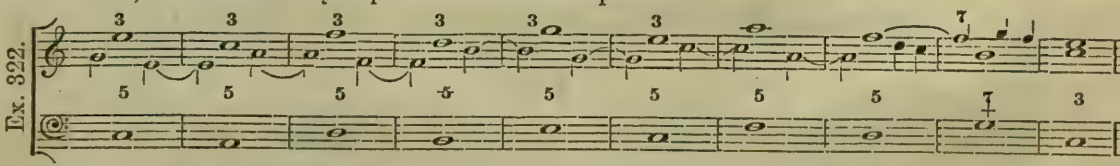
The same passage, with consonant syncopations in all the parts:—

Ex. 321.



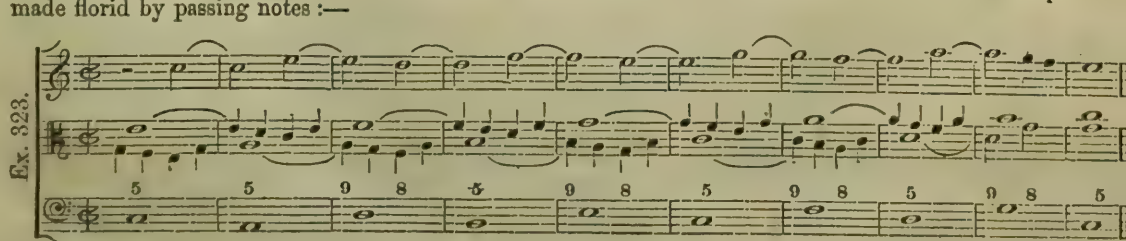
The same, with consonant syncopations in the second part:—

Ex. 322.



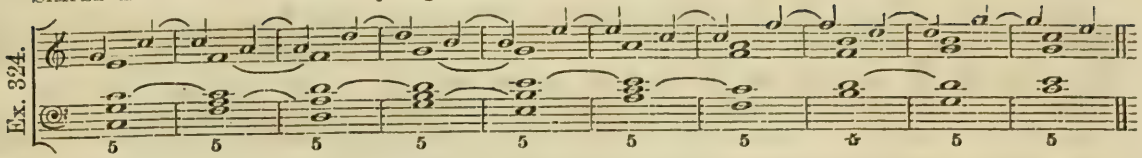
The same passage, wherein the octave is retarded in the first part, and the two intermediate parts are made florid by passing notes:—

Ex. 323.



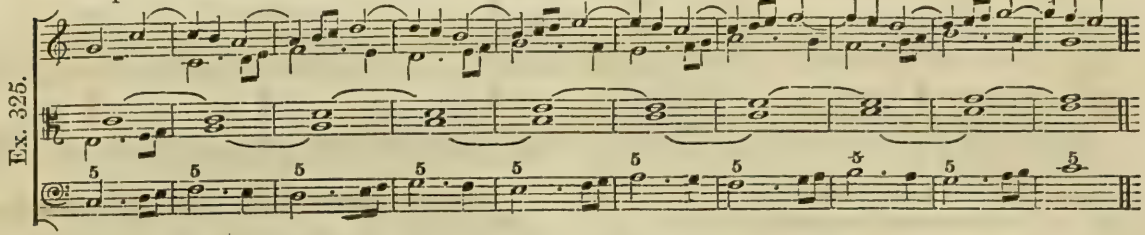
SIMPLE HARMONY. Consonant syncopations in the first part :—

Ex. 324.



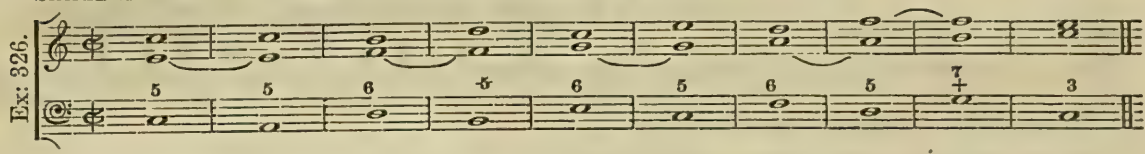
The leaps of a fourth and of a third filled up by passing notes :—

Ex. 325.



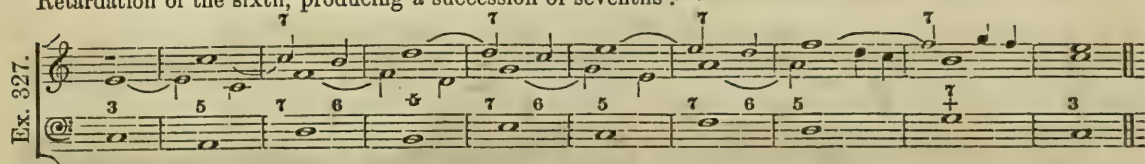
SIMPLE HARMONY. A succession of common chords and sixths :—

Ex. 326.



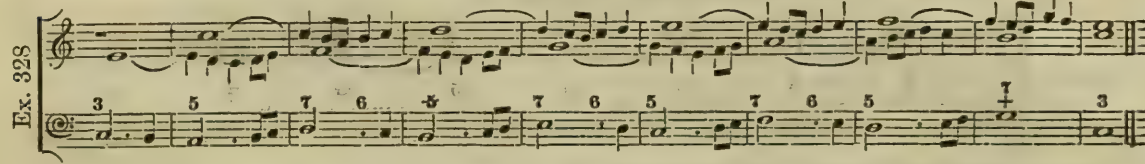
Retardation of the sixth, producing a succession of sevenths :—

Ex. 327.



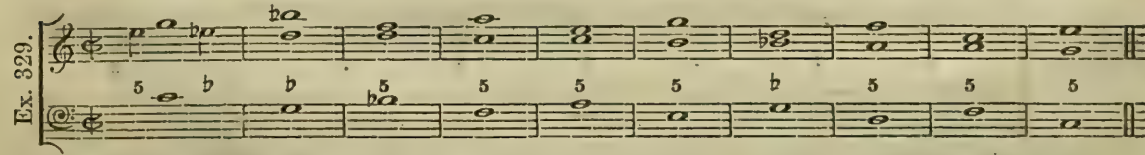
The leaps of a third and a fourth filled up by passing notes :—

Ex. 328



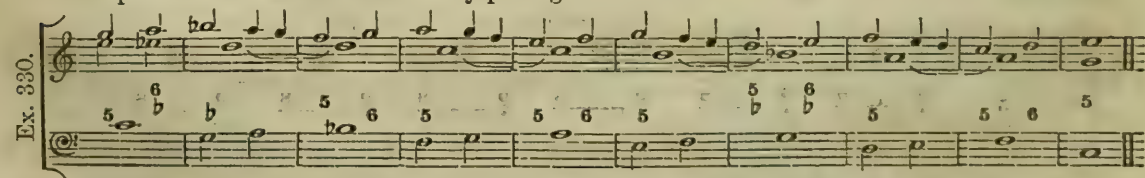
SIMPLE HARMONY. A succession of common chords. In this example the key is not determined :—

Ex. 329.



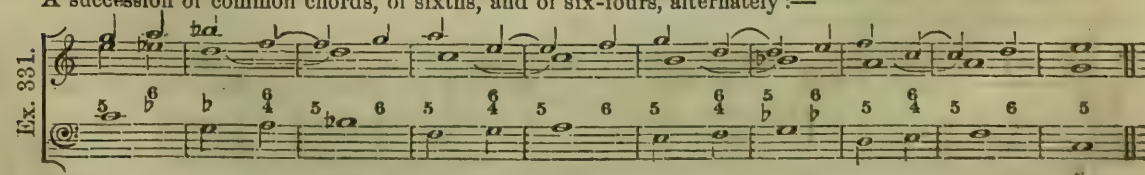
The leaps of a third and a fourth filled by passing notes :—

Ex. 330.



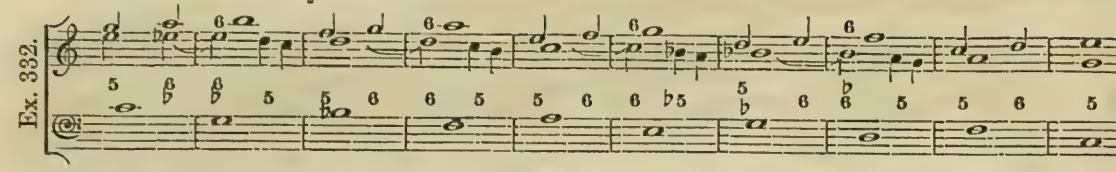
A succession of common chords, of sixths, and of six-fours, alternately :—

Ex. 331.



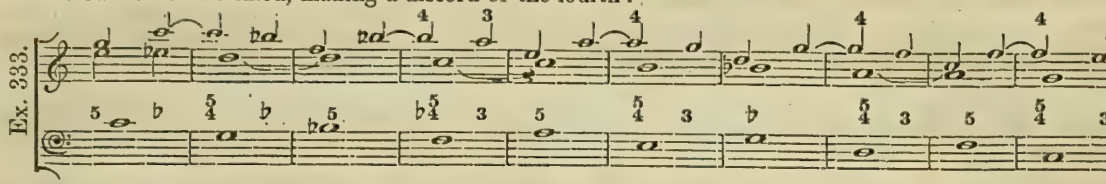
Retardation of the fifth by the sixth :—

Ex. 332.



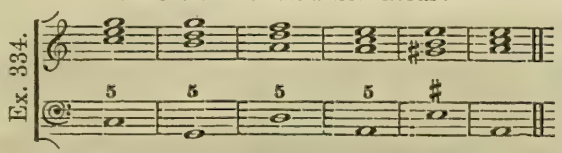
Retardation of the third, making a discord of the fourth :—

Ex. 333.



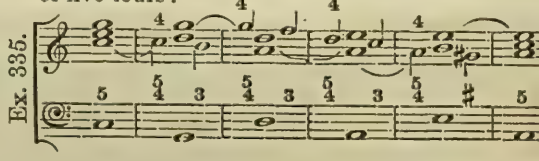
Simple Harmony.
A succession of common chords :—

Ex. 334.



Retardation of the thirds, producing a succes
of five-fours :—

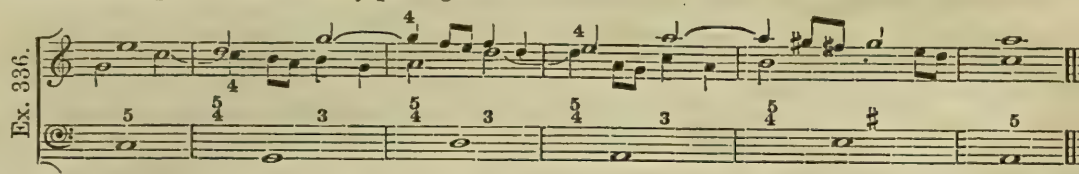
Ex. 335.



This example concludes in the relative key.

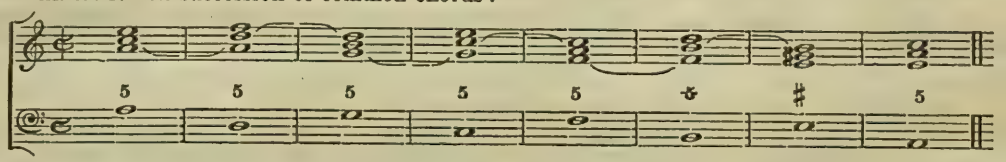
The two first parts made florid by passing notes :—

Ex. 336.



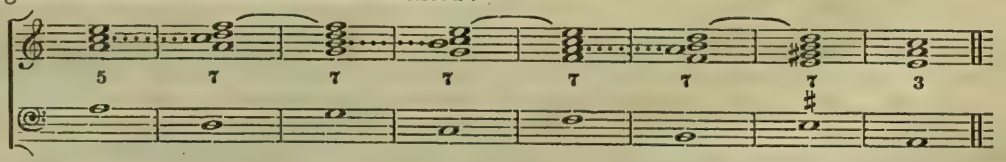
Simple Harmony. A succession of common chords :—

Ex. 337.



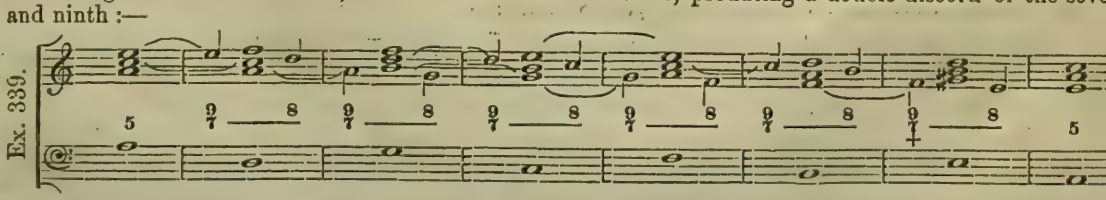
Prolongation of the seventh on the common chord :—

Ex. 338.



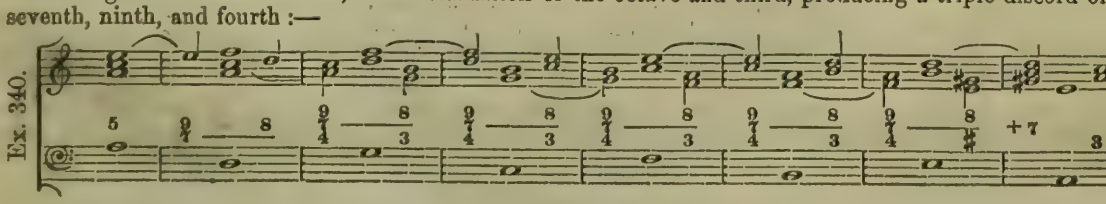
Prolongation of the seventh, and retardation of the octave, producing a double discord of the seve
and ninth :—

Ex. 339.



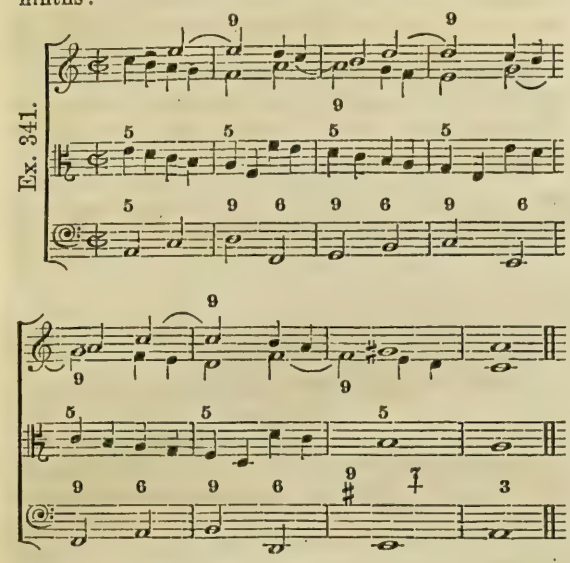
Prolongation of the seventh, with retardation of the octave and third, producing a triple discord of
seventh, ninth, and fourth :—

Ex. 340.



Retardation of the octave, causing a succession of ninths :—

Ex. 341.



ARTICLE X.

Genera.

There are three genera :—the Diatonic, the Chromatic, and the Enharmonic.

The diatonic genus proceeds by natural tones and semitones ; that is to say, without alteration : thus, the two semitones which are found in the scale, are of the diatonic genus ; and the scale, either ascending or descending, is called the diatonic gamut or scale :—

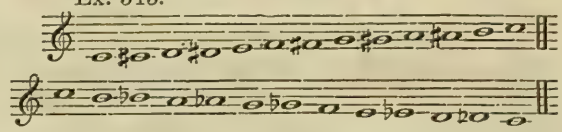
Ex. 342.



The chromatic genus proceeds only by semitones ; thus, a scale ascending or descending by semitones, is called the chromatic gamut or scale.

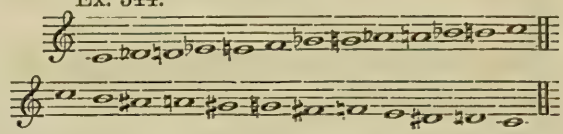
In ascending, the chromatic by sharps is employed ; and in descending, the chromatic by flats, as being the most natural way :—

Ex. 343.



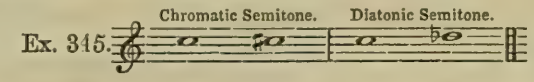
Nevertheless, it may be employed in both ways, either ascending or descending :—

Ex. 344.



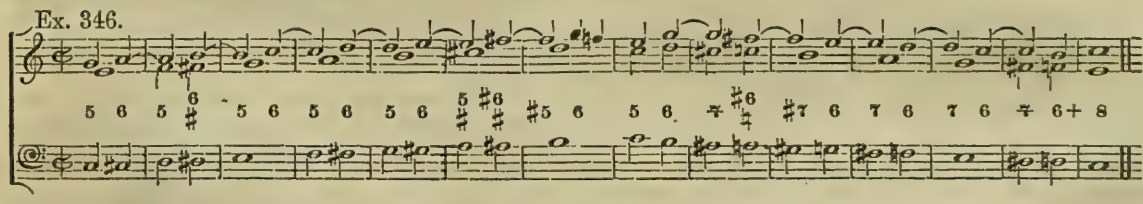
Although a succession of semitones is called chromatic, yet the chromatic semitone, properly speaking, is only the semitone that exists between one note and the same note, subjected to alteration ; while the diatonic semitone is that which exists between one note and another :—

Ex. 345.



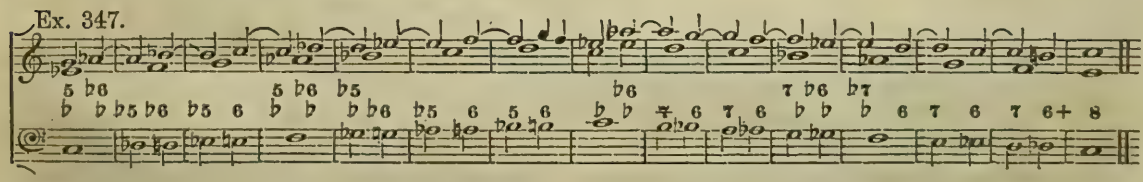
Chromatic scale by sharps :—

Ex. 346.



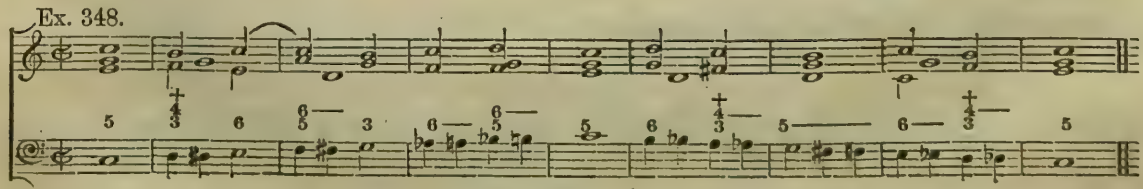
Chromatic scale by flats :—

Ex. 347.



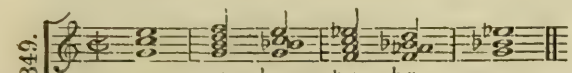
Another chromatic scale :—

Ex. 348.



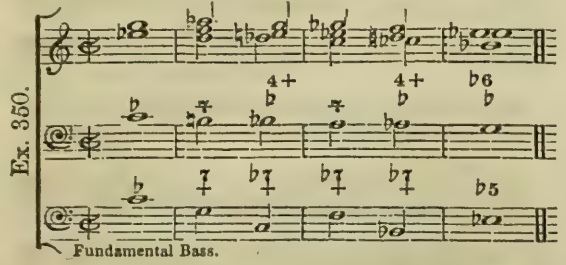
Chromatic succession produced by a series of avoided cadences:—

Ex. 349.



The same by diminished sevenths. In this succession all the parts proceed by chromatic progression:—

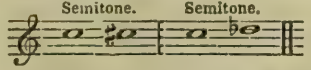
Ex. 350.



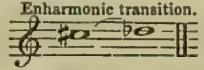
The enharmonic genus is the transition of one note to another, without its intonation undergoing any perceptible change.

For instance, from C to C♯ a semitone is reckoned, and from C to D♭ a semitone is also reckoned; these two sounds have therefore the same intonation, according to the temperament; thus, if after a D♭ comes a C♯, or after a C♯ a D♭, these two notes will not sustain any perceptible change of intonation, although their names be changed. The transition of one of these notes to the other is called *enharmonic*:—

Ex. 251.

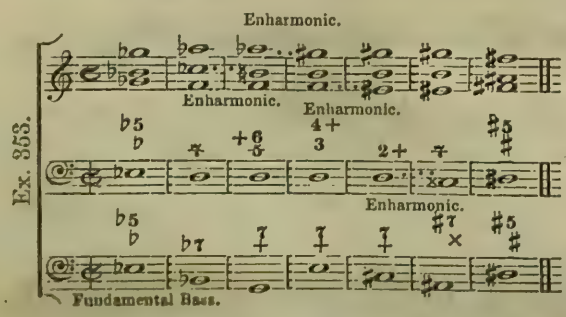


Ex. 252.



The chord of the diminished seventh is that which naturally produces the enharmonic genus, since it may be presented under four different aspects, without its undergoing any perceptible change of intonation:—

Ex. 353.



This example begins in E♭ minor; at the third bar the C♭ becomes B♮; at the fourth bar the A♭ becomes G♯; at the fifth bar the F becomes E♯; at the sixth bar the D becomes C×; and the exam concludes in D♯ minor, which is the correspo ing key to that of E♭ minor, the one in whic commenced.

It should be observed, that it is always the cord of the diminished seventh, which underg alteration, and which produces the enharmo transition.

The succession of the fundamental bass notes, monstrates that it is a series of interrupted caden which has introduced the transition.

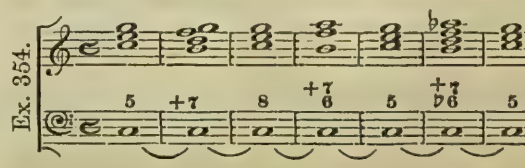
ARTICLE XI.

Pedal.

A pedal, or pedal-point, is a prolonged note the bass, upon which are introduced chords, that alien to it, but that from time to time contain note, otherwise the effect of the pedal would unpleasing.

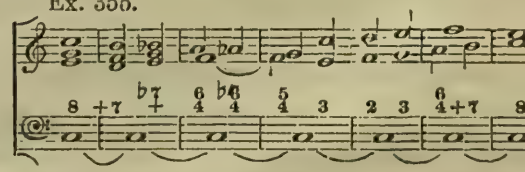
A pedal should occur either on the tonic, o the dominant. The pedal on the tonic is especi suited to introduce the chord of the dominant seve that of the imperfect seventh, and that of the minished seventh, because all these chords being solved on the tonic, the pedal note frequently fo part of the harmony:—

Ex. 354.



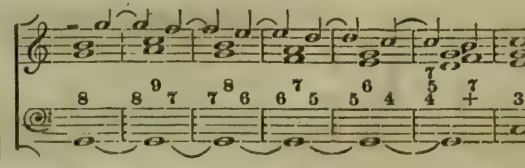
Modulations may be made on the pedal, by c sidering it alternately as a tonic and as a dominant

Ex. 355.

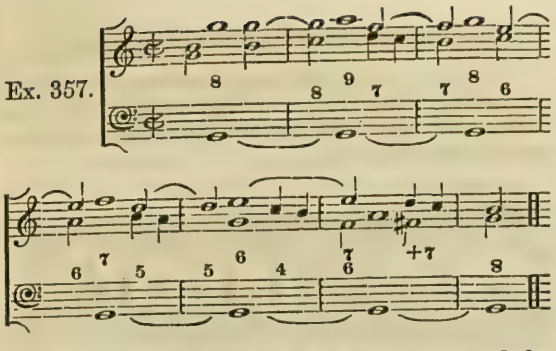


The pedal on the dominant is a vehicle for all consonant and dissonant progressions. It sho commence by a pause on the dominant, and fi with the perfect cadence, or close on the dominant

Ex. 356.

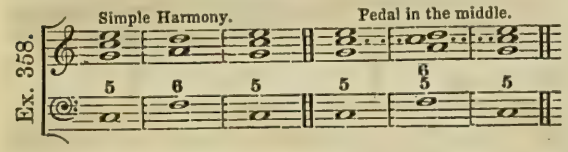


Ex. 357.



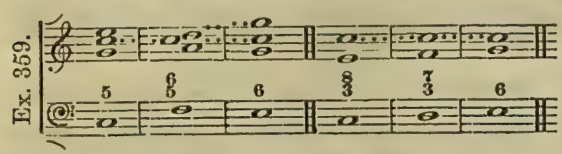
The pedal takes place in the lowest part, and the harmony above it should be at as great a distance as possible. Nevertheless, there are cases, where a pedal may be placed in the middle part of the harmony, or even in the highest part, provided the prolonged note form a portion of the following chord :—

Ex. 358.

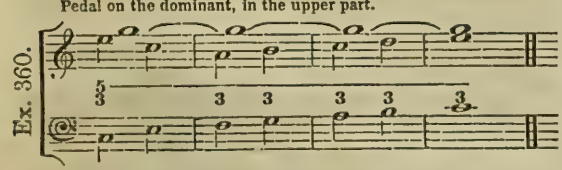


When a pedal—either in the middle, or highest part—forms an interval of a second or seventh, with one of the notes of the chord, this note must not connect itself with the pedal note by unison or octave, but must be separated from it by a consonant interval :

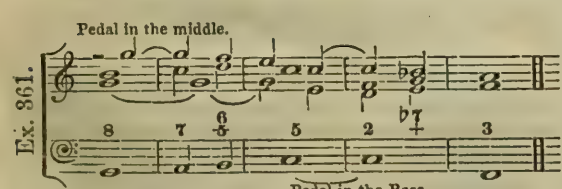
Ex. 359.



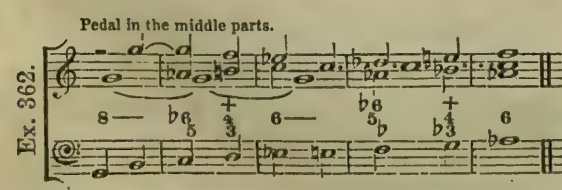
Ex. 360.



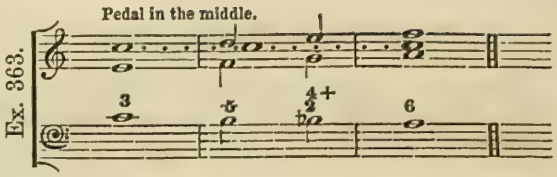
Ex. 361.



Ex. 362.



Ex. 363.

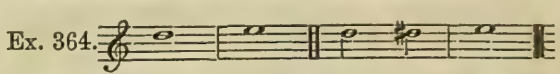


ARTICLE XII.

Alterations.

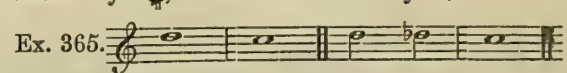
One or more notes of a chord may be altered, when this alteration leads the note in its due course. For instance, if the D is to ascend to E, it can, after touching upon the D♮, pass to the D♯, which leads to E :—

Ex. 364.



But if the D is to descend to C, instead of being altered by a ♯, it should be altered by a ♭ :—

Ex. 365.

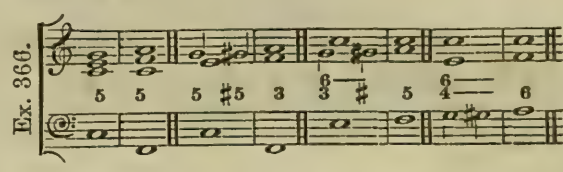


Every chord may be subjected to one or more alterations.

Major Common Chord, altered.

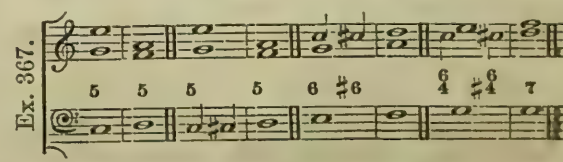
The major common chord may be altered in its fifth, when ascending; this alteration produces an interval of the extreme sharp fifth, and the chord consists of two major thirds. In the inversions, this alteration may equally take place :—

Ex. 366.



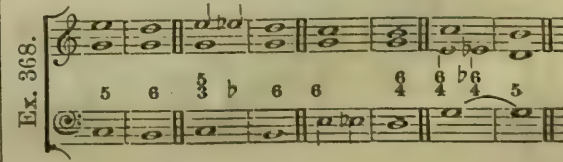
The major common chord may also be altered in its fundamental note, when ascending; in which case, the chord becomes diminished :—

Ex. 367.



The major common chord may likewise be altered in its third, when descending; in which case, the chord becomes minor :—

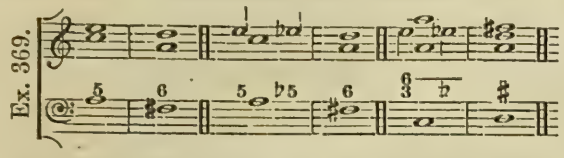
Ex. 368.



Minor Common Chord, altered.

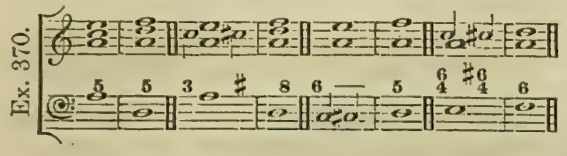
The minor common chord may be altered in its fifth, when descending; in which case the chord becomes diminished :—

Ex. 369.



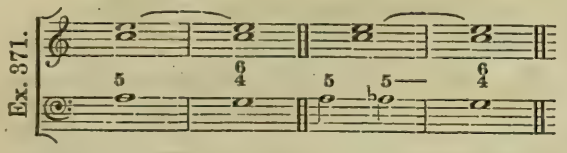
In may also be altered in its third, when ascending; in which case, the chord becomes major :—

Ex. 370.

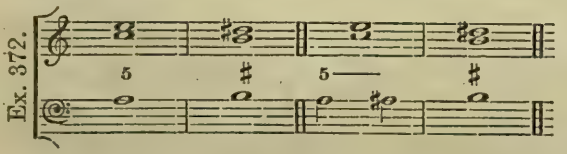


It may likewise be altered in its fundamental note, either when descending or ascending. The alteration, when descending, produces a superfluous fifth; and when ascending, it produces a diminished third and diminished fifth :—

Ex. 371.

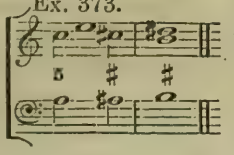


Ex. 372.



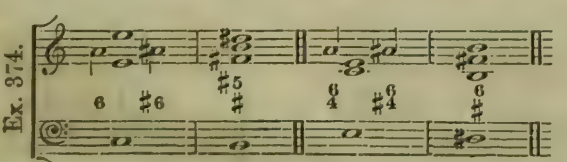
In order to avoid the interval of a diminished third, the third should be altered at the same time as the fundamental note :—

Ex. 373.



As the inversion of the diminished third forms an interval of a superfluous sixth, the best method of employing this alteration is to present the chord as a sixth (inversion), and in this way it is an alteration frequently used :—

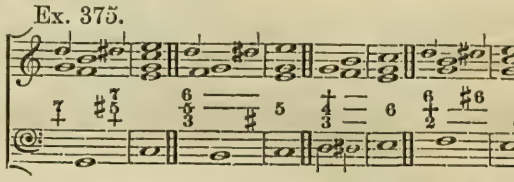
Ex. 374.



Chord of the Dominant Seventh, alteer

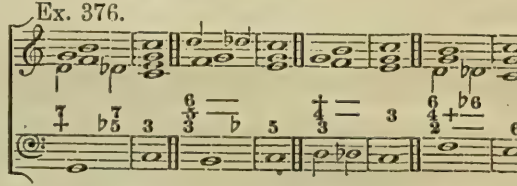
The chord of the dominant seventh may be alt in its fifth, either when ascending or descending taking care to invert the diminished third in superfluous sixth :—

Ex. 375.



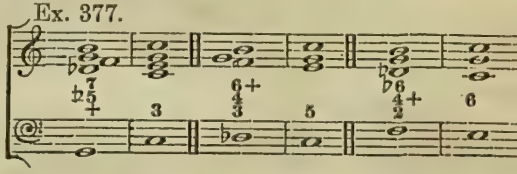
When the dominant seventh is altered in its descending, this alteration which (in the key o changes the D natural into D flat, announces the of F minor; and the common chord of C is no o than a pause on the dominant :—

Ex. 376.



This alteration may take place without being ceded by the natural note :—

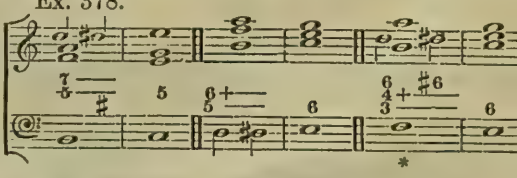
Ex. 377.



Chord of the Imperfect Seventh, altere

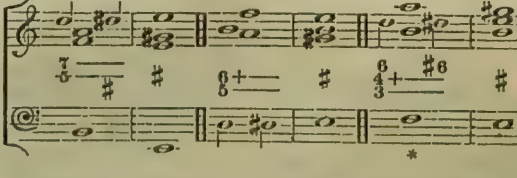
The chord of the imperfect seventh may be alte in its third, when ascending, and by inverting interval of the diminished third into that of the su fluous sixth :—

Ex. 378.



The same chord, considered as the seventh of second in the minor mode, may be altered, by tak care to invert the diminished third into the su fluous sixth :—

Ex. 379.



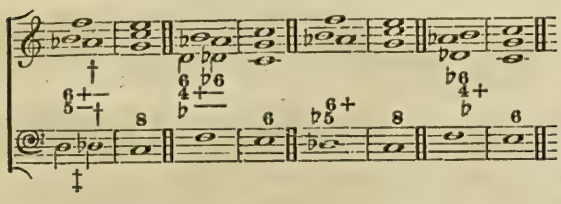
* This chord is known as that of the superfluous sixth and triton

Chord of the Diminished Seventh, altered.

The chord of the diminished seventh may be altered in its third, when descending.

This alteration is used only on the two first derivatives of the diminished seventh :—

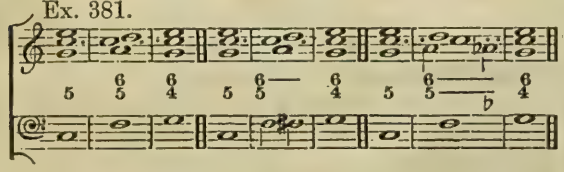
Ex. 380.



The common chord which follows the alteration of the diminished seventh, should be major ; for this passage is no more than a pause on the dominant.

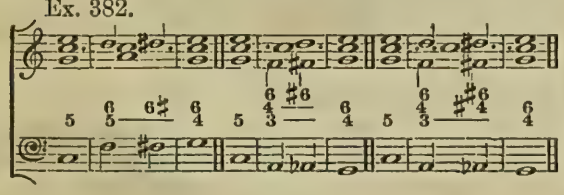
The prolongation of a note alien to a chord, does not prevent the notes of which this chord is formed, from undergoing the alterations proper to them :—

Ex. 381.



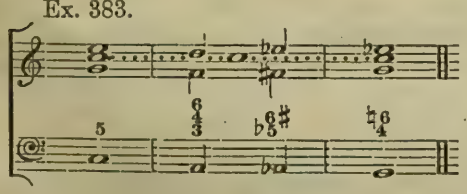
One, two, or even three notes of the chord may be altered, while the prolongation continues :—

Ex. 382.



In order to avoid the interval of the fourth doubly sharpened, which exists from the A♭ to the D𝄪, E♭ is written instead of D𝄪 :—

Ex. 383.



† The two successive fifths contained in this passage, are tolerated, provided they do not occur in the extreme parts ; that is to say, between the highest part and the lowest part.

‡ This chord is known as that of the superfluous sixth and fifth.

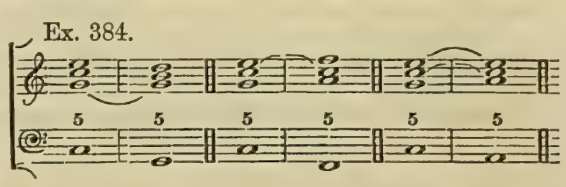
ARTICLE XIII.

Modulation.

Modulation is the passing from one key or mode into another.

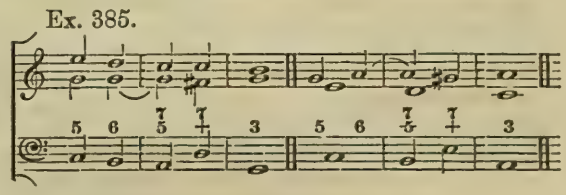
In order to render modulation pleasing, the common chord of the key quitted, should carry into the key entered, at least one note belonging equally to the two chords, which shall serve as a connection in the harmony :—

Ex. 384.



But a key is not determined by its common chord only : its leading note should also be present ; wherefore, the best means of determining the key, is the perfect cadence, since that gives the leading note followed by the tonic :—

Ex. 385.



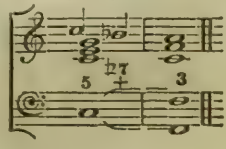
Modulation may be effected by fifths ascending or descending.

Each modulation by ascending fifths, introduces an additional sharp to the key.

Each modulation by descending fifths, introduces an additional flat to the key.

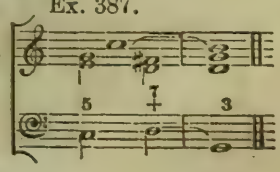
The most natural modulations are those by descending fifths ; because, without the aid of any intermediate chord, the modulation may pass from C into F, from F into B flat, &c. The minor seventh only need be added to the major common chord, and it will become the chord of the dominant seventh, forming a perfect cadence by descending from the fifth on to the tonic ; which cadence will completely determine the key :—

Ex. 386.



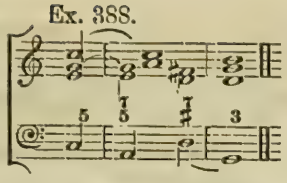
If, on the contrary, the modulation is by ascending fifths, the common chord of the key into which it goes, must be preceded by ts own dominant seventh :—

Ex. 387.



It is necessary that this dominant should itself be connected with the preceding chord by several notes, and in this way it will be better introduced:

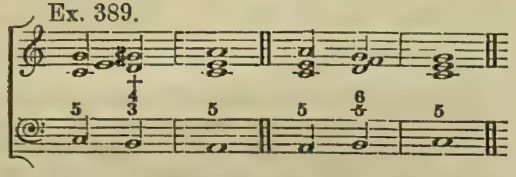
Ex. 388.



Thus, it is more simple, as well as more easy, to modulate by fifths descending, than by fifths ascending. Nevertheless, in any piece of music, the first modulation, when quitting the primitive key goes into the dominant, which is the fifth above; and the modulation into the subdominant, which is the fifth below, does not take place till afterwards.

Modulation into the relative key, is also one of the most simple, and most frequently used,—whether by passing from the major into its relative minor, or by passing from the minor into its relative major:—

Ex. 389.

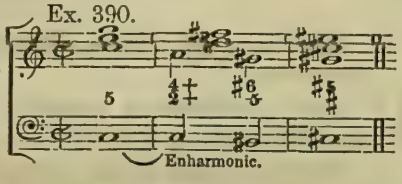


Observation.—Modulations are principally effected by means of cadences; and by avoiding or interrupting them. Beyond this, it is difficult to prescribe rules for modulation; the only one from which no deviation should be made, is, to satisfy the ear. It is the essential end of music; and rules are only created, in order that it shall be securely attained.

Modulations from C Major into all the Major and Minor Keys.

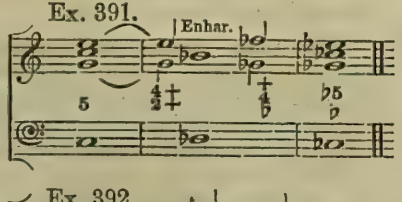
From C major to C♯ major.

Ex. 390.



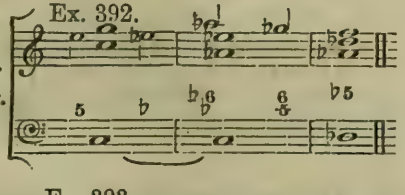
From C major to C♭ major.

Ex. 391.



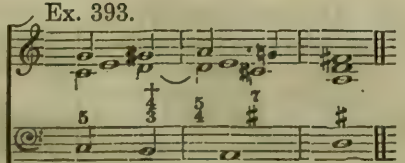
From C major into D♭ major.

Ex. 392.



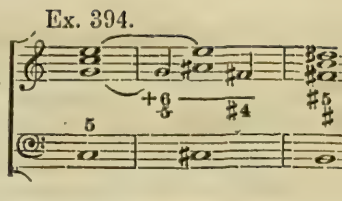
From C major into D major.

Ex. 393.



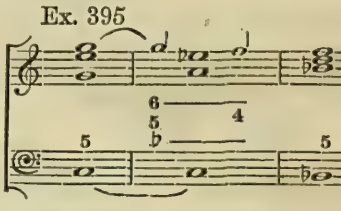
From C major into B major.

Ex. 394.



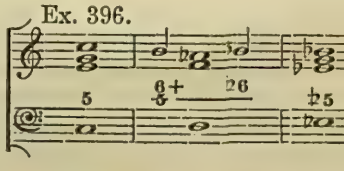
From C major into B♭ major.

Ex. 395



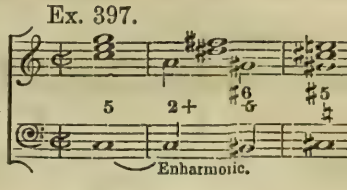
From C major into E♭ major.

Ex. 396.



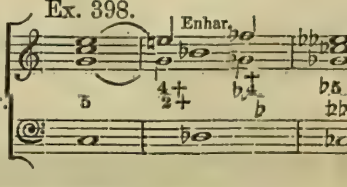
From C major into C♯ minor.

Ex. 397.



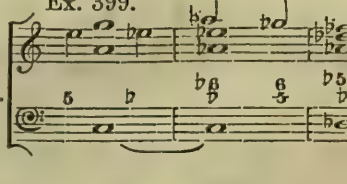
From C major into C♭ minor.

Ex. 398.



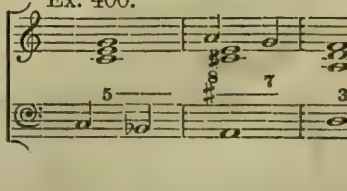
From C major into D♭ minor.

Ex. 399.



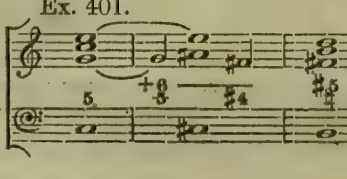
From C major into D minor.

Ex. 400.



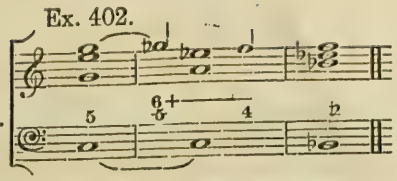
From C major into B minor.

Ex. 401.



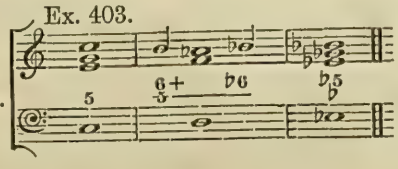
Ex. 402.

From C major into B♭ minor.



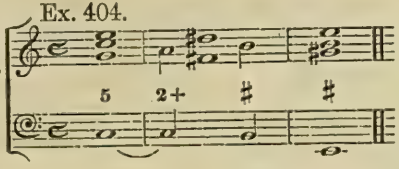
Ex. 403.

From C major into E♭ minor.



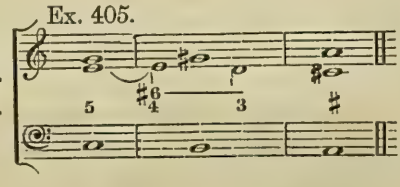
Ex. 404.

From C major into E major.



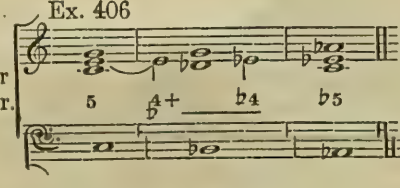
Ex. 405.

From C major into A major.



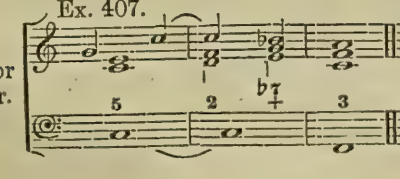
Ex. 406

From C major into A♭ major.



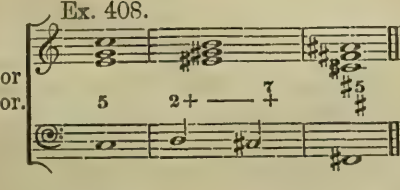
Ex. 407.

From C major into F major.



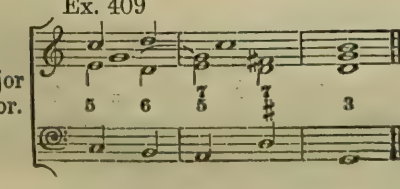
Ex. 408.

From C major into F♯ major.



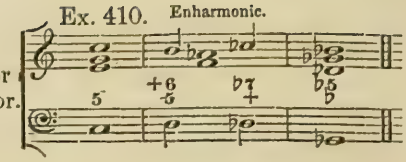
Ex. 409

From C major into G major.



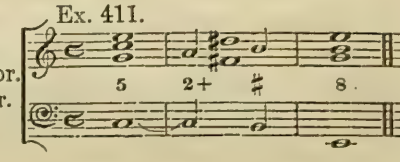
Ex. 410. Enharmonic.

From C major into G♭ major.



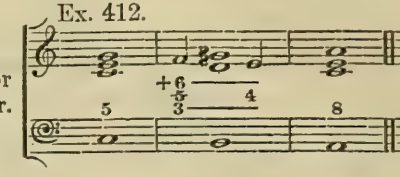
Ex. 411.

From C major into E minor.



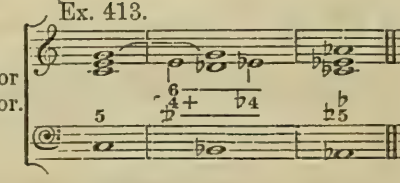
Ex. 412.

From C major into A minor.



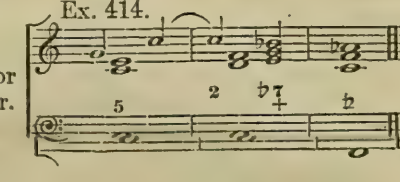
Ex. 413.

From C major into A♭ minor.



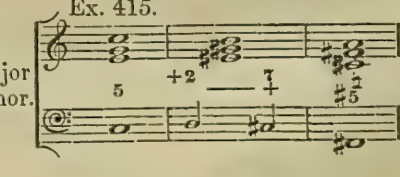
Ex. 414.

From C major into F minor.



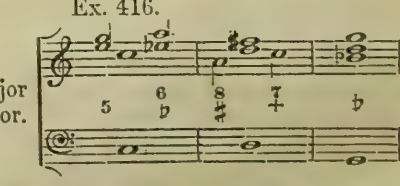
Ex. 415.

From C major into F♯ minor.



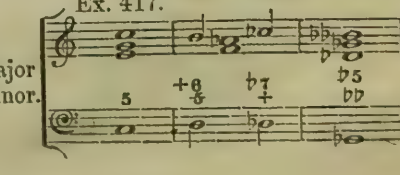
Ex. 416.

From C major into G minor.



Ex. 417.

From C major into G♭ minor.



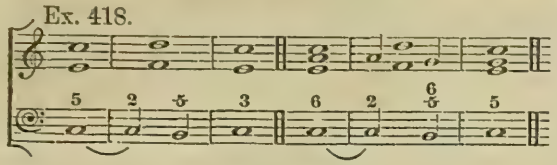
ARTICLE XIV.

On the Method of Figuring.*

The figures are placed on the notes of the bass, to represent the harmony.

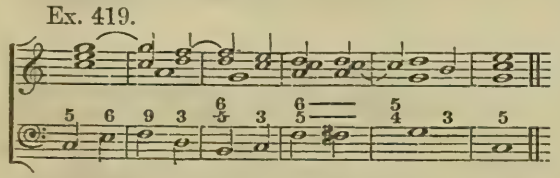
A figure not only represents the interval it designates, but it implies one or more others beside. For instance, a 2 implies $\frac{4}{2}$, and sometimes $\frac{6}{4}$.

Ex. 418.



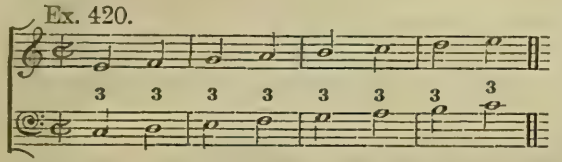
A 3 implies $\frac{5}{3}$, or $\frac{8}{3}$. The common chord is figured by a 3, when the resolution of a discord takes place on the third :—

Ex. 419.

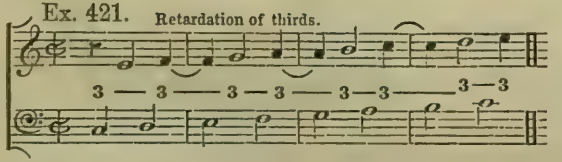


Nevertheless, when several thirds in succession are figured, no other note of accompaniment is requisite :—

Ex. 420.

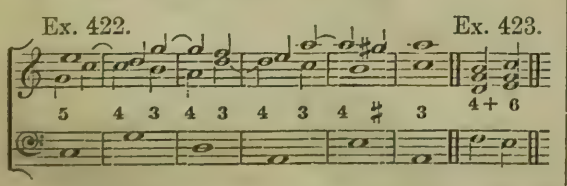


Ex. 421. Retardation of thirds.



A 4 implies $\frac{5}{4}$; but a four attended by a cross (+ 4) indicates the chord of tritone, which is accompanied by a second and a sixth :—

Ex. 422. Ex. 423.

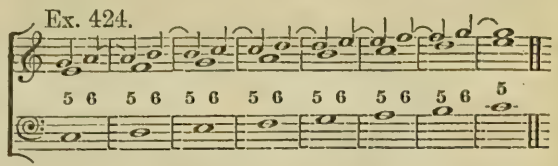


* This Article is essential for those who wish to accompany on the harpsichord (or pianoforte, or organ).

A 5 implies $\frac{5}{3}$.

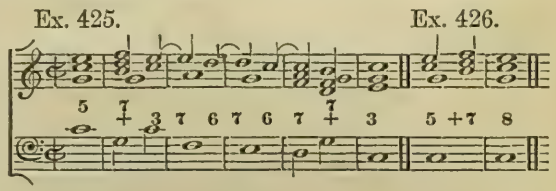
A 6 implies $\frac{6}{3}$:—

Ex. 424.



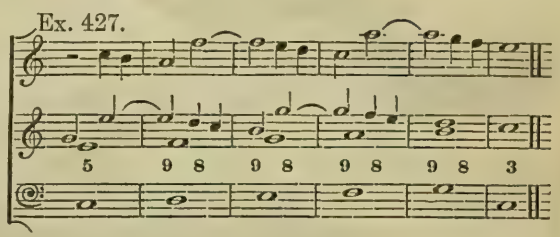
A 7 implies $\frac{7}{3}$, and sometimes $\frac{7}{5}$; but the seven attended by a cross (+ 7), indicates the dominant seventh on the tonic, and then the 7 implies $\frac{+7}{5\ 4\ 2}$:—

Ex. 425. Ex. 426.



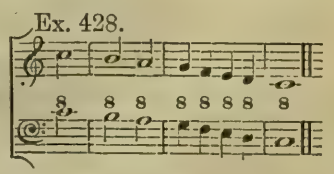
An 8 implies $\frac{8}{3}$. The common chord is figured by an 8, when the resolution of a discord takes place on the octave. A 9 implies $\frac{9}{5\ 3}$:—

Ex. 427.



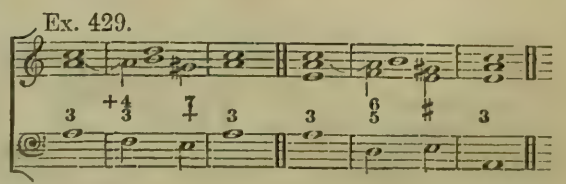
When several 8's follow in succession, they merely indicate unisons :—

Ex. 428.



Sometimes two figures imply one or more others beside. For instance, $\frac{4}{3}$ implies $\frac{6}{4\ 3}$; and $\frac{6}{5}$ sometimes implies $\frac{6}{5\ 3}$.

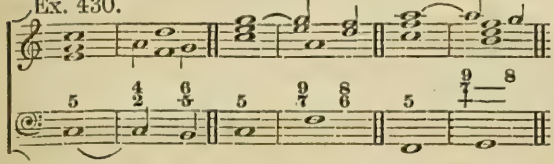
Ex. 429.



$\frac{4}{2}$ sometimes implies $\frac{6}{4}$.

$\frac{9}{7}$ implies $\frac{9}{7}$, and sometimes $\frac{9}{7}$:—

Ex. 430.



In order to avoid the difficulty of knowing whether it be requisite to add one or more intervals to the figure designated, the best way is to accompany in three parts only, adding no more than the most essential interval to each single figure; and to add more when there are two figures. By this means, no fault can be committed; since it is better to omit a note of little consequence in a chord, than to add one which does not belong to it.

Thus:—a 2 should be accompanieed by $\frac{4}{2}$; a 3 by $\frac{8}{3}$, or by $\frac{5}{3}$; a 4 by $\frac{5}{4}$; a +4 by $+\frac{4}{2}$; a 5 by $\frac{5}{3}$; a 6 by $\frac{6}{3}$; a 7 by $\frac{7}{3}$; a +7 by $+\frac{7}{2}$, or $+\frac{7}{4}$; an 8 by $\frac{8}{3}$; a 9 by $\frac{9}{3}$; and all the double figures, whatever they be, by adding nothing to them.

This method of proceeding can never lead to error; since the purest harmony is in three parts:—

Ex. 431.





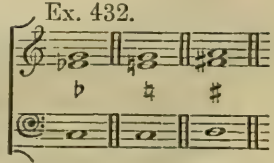
There are added, either before, over, or beneath the figures, particular marks, which alter certain intervals either expressed or implied by the figures.

These marks are:—the sharp, ♯; the flat, ♭; the natural, ♮; the cross, +; and the stroke aslant the figure, as, -5-.

The cross is a sign of augmentation, indicating a leading note, or a superfluous interval. The stroke is a sign of diminution, indicating a diminished interval.

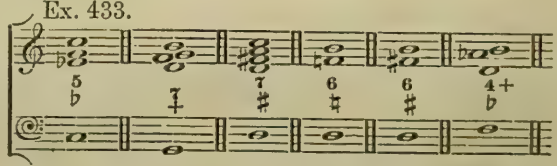
When one of these marks occurs unattended by a figure, it represents a third, which undergoes the alteration indicated by the mark:—

Ex. 432.



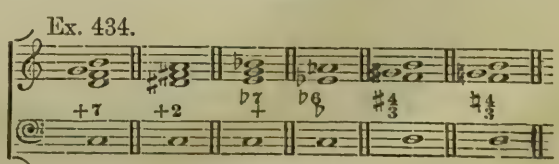
When the mark is beneath any figure, it represents a third, which it causes to undergo the alteration indicated:—

Ex. 433.



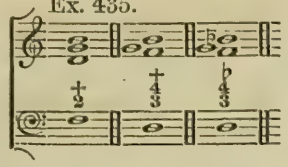
When the mark is before the figure, it alters the interval represented by the figure:—

Ex. 434.



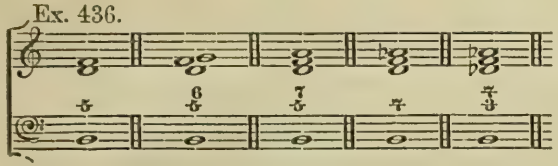
When the mark is over the figure, it indicates the interval implied above the figure. Over a 2, it indicates the fourth. Over a $\frac{4}{3}$, it indicates the sixth:

Ex. 435.



The figure with a stroke aslant it, indicates that the interval is diminished:—

Ex. 436.



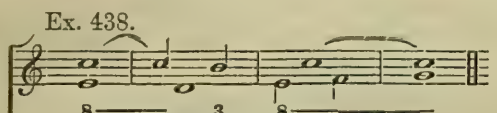
When a line is drawn after the figure, the chord should be prolonged until the following figure:—

Ex. 437.



If the chord contain several figures, and the line be placed after only one of them, no more than the note indicated, must be prolonged:—

Ex. 438.



The words TASTO SOLO which are usually placed over a pedal, indicate that no chord is to be played by the right hand.

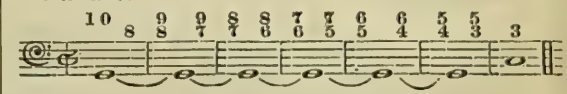
When the pedal is to be figured, the figures should be placed according to the order observed in Harmony:—

Ex. 439.



Instead of lines the figures may be repeated:—

Ex. 440.



ADDITIONAL NOTE FROM THE GERMAN EDITION.

The improved method of figuring, introduced in this work, may be estimated by the following particulars:—

The diminished fifth is marked by a stroke through it (♮); and the augmented fourth, which is derived from it, by a simple cross prefixed (+4). Catel uses the same sign to mark the chord of the dominant seventh, and its derivatives; viz., $\frac{7}{+}$ instead of $\frac{7}{3}$, or $\frac{7}{3}$, or $\frac{7}{5}$; $\frac{6}{♮5}$ instead of $\frac{6}{5}$; $\frac{+}{3}$ instead of $\frac{6}{3}$; and $\frac{+}{2}$ instead of $\frac{6}{4}$ or $\frac{2}{4}$. Our author figures the chord of the diminished seventh, $\frac{♮7}{}$, instead of $\frac{♭7}{5}$; the derived chord of the fifth and sixth, he figures thus, $+\frac{6}{♮5}$, instead of $♭\frac{6}{5}$; the chord of the three-four $+\frac{4}{♭}$ instead of $\frac{6}{♭4}$; and lastly, the chord of the second, +2 instead of $\frac{6}{2}$.

THE END.

THEORETICAL SERIES.—No. 8.

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"Studies serve for delight, for ornament, and ability. * * * There is no stond or impediment in the wit, but may be wrought out by fit studies."—*Lord Bacon.*

ELEMENTS

OF

MUSICAL COMPOSITION;

COMPREHENDING THE

RULES OF THOROUGH-BASS,

AND THE

THEORY OF TUNING.

BY

WILLIAM CROTCH,

MUS. DOC., PROF. MUS. OXON.

THE THIRD EDITION, CAREFULLY REVISED BY

THOMAS PICKERING,

DIRECTOR OF THE CHORAL SOCIETY, ROYSTON.

LONDON:

J. ALFRED NOVELLO, 69, DEAN STREET, SOHO, AND 35, POULTRY;

ALSO IN NEW YORK, AT 389, BROADWAY.

1856.

To VINCENT NOVELLO, Esq.

In grateful acknowledgement of many benefits and much valuable instruction received from him, this edition of Crotch's Elements of Musical Composition is inscribed, by his attached friend and pupil,

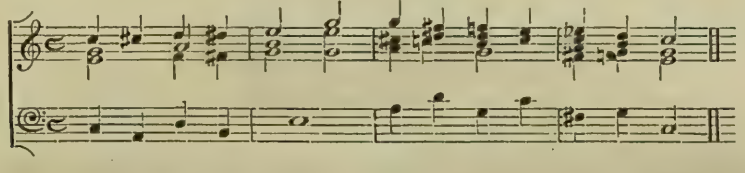
Royston, 21*st Dec.*, 1855. THOMAS PICKERING.

BIOGRAPHICAL SKETCH OF DR. CROTCH.

The author of the Elements of Musical Composition was born at Norwich, in 1775. His father, who was a carpenter in that city, having fortunately a taste for, and love of, music, had built himself an organ, and this led to the discovery and development of the extraordinarily precocious genius of his son. When the boy was little more than two years old, his mother, to quiet him, placed him at the organ, where he amused himself by pressing down the keys; and, on the experiment being repeated the following morning, he succeeded in playing, of course from memory, "God save the King," which he had heard and noticed the day before. So remarkable an instance of precocity naturally attracted the attention of many lovers of the Art, and, among these, Dr. Burney appears to have closely investigated the case, which he made the subject of a paper published in the Philosophical Transactions of the Royal Society for the year 1779.

Dr. Burney occasionally tested young Crotch's powers by requiring him to add a bass to a subject played by himself, and has left on record the following specimen of the child's successful efforts of this kind, and his power at that early age of

Untwisting all the chains that tie
The hidden soul of harmony.



The upper line contains the subject as played by Dr. Burney, and the lower, the bass, which the child, who was then not four years old, of his own accord, added to it.

Daines Barrington, who has also left an interesting paper on the subject, states that he heard the boy, when only three years and a half old, play "God save the King," and the "Minuet de la Cour," almost throughout with chords. At another interview, he exhibited the utmost readiness in playing the above-mentioned minuet in any key which was called for, concluding with the remote one of F♯ major, then seldom or never used. His talent was not confined to music. Dr. Burney states that he appeared possessed of a general intelligence beyond his age, and had discovered a genius and inclination for drawing nearly as strong as for music; and when music subsequently became his profession, the sister art of painting continued through life one of his favorite recreations.

When between eleven and twelve years of age, he acted as deputy-organist for Dr. Randall, at the chapels of King's and Trinity Colleges, and the University Church of Great St. Mary's at Cambridge, where he was then residing. He here composed an Oratorio, called the *Captivity of Judah*, which many years afterwards was performed at Oxford, but of which only a few movements have ever been published. He then removed to Oxford, and entered on a course of study with the intention of entering the Church. Circumstances having changed his plans, he resumed the Profession of Music, and took his Bachelor's Degree in 1794, and that of Doctor in 1799. In 1800 he delivered a Course of Lectures in the Music School at Oxford, which were afterwards published by Messrs. Longman and Co., together with three volumes of specimens in illustration of these lectures, now published by Messrs. Cramer and Co. He was afterwards appointed Lecturer on Music at the Royal Institution; and, in 1823, he became Principal of the Royal Academy of Music. His works as composer and arranger are numerous, but his reputation in the former character rests principally upon his oratorio of *Palestine*. His peaceful, virtuous, and useful life, closed 29th December, 1847.

AUTHOR'S PREFACE TO THE FIRST EDITION.

A KNOWLEDGE of the Elements of Musical Composition and Thorough Bass is happily become almost indispensable to a Musical Education.

The present work was at first intended for the author's pupils, but is now published with the hope that it may become more generally useful.

Originality seldom forms the leading feature of a work of this nature, the excellence of which should consist chiefly in the accumulated experience of many treatises. Those already published have been consulted, but their language has not, intentionally at least, been adopted. They have contributed materially to such parts of this work as may be found to possess any merit; and for the rest the author wishes he could offer a better recommendation than novelty.

No. 2, *Duchess Street, Jan.* 6, 1812.

AUTHOR'S PREFACE TO THE SECOND EDITION.

THE demand for a second Edition of this work is gratefully acknowledged by the author, and has induced him to make many additions and alterations, and to correct the errors and imperfections of the former edition, as far as he has been able to detect them.

No. 10, *Holland Street, Kensington, October*, 1833.

PUBLISHER'S PREFACE TO THE THIRD (PRESENT) EDITION.

THE value of Dr. Crotch's "Elements of Musical Composition" has been so generally appreciated, as to have exhausted the copies of two large editions. The work having thus become out of print, arrangements were made with the proprietors of the remaining copyright for permission to include the work in NOVELLO'S LIBRARY FOR THE DIFFUSION OF MUSICAL KNOWLEDGE, and the present copy is presented at a considerably less price than the former editions.

The text of Dr. Crotch's work is reproduced in its integrity, with all the author's additions made in 1833; but the improvements in musical typography have allowed the musical examples to be properly incorporated with the explanation, so as to present both at one view;—several illustrations also, referred to only in the former editions, are here included at length, amounting to an addition of several pages. A few notes by the editor, distinguished by being printed in a different type, have been inserted. And finally, is added, as an appendix, the series of questions and answers prepared by the Doctor for the examination of his pupils while they were studying from his "Elements of Musical Composition."

69, *Dean Street, Soho, January*, 1856.

DR. CROTCH'S

ELEMENTS OF MUSICAL COMPOSITION.

CHAPTER I.

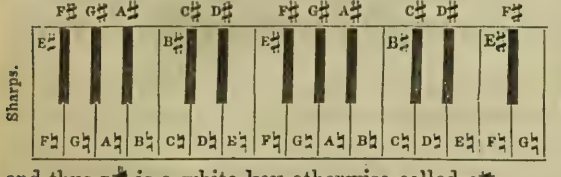
Of Notes, Intervals, Scales, and Keys.

A NOTE or single sound, whether produced by one or more strings, pipes, voices, or instruments, is called a unison. Twelve different notes are produced by the seven white and five black keys of a keyed instrument,* not including the repetitions of notes of the same name, higher or lower, called their octaves. The difference of pitch between any two notes is called an interval. The smallest interval, as from any note to the next above or below it, is called a semitone. A tone is the distance from any note to the next but one, above or below it, and is equal to two semitones. Notes are either naturals, sharps, flats, double sharps, or double flats.

The seven white keys are generally naturals, and are then called, A♮, B♮, C♮, D♮, E♮, F♮, G♮, or simply A, B, C, D, E, F, G.

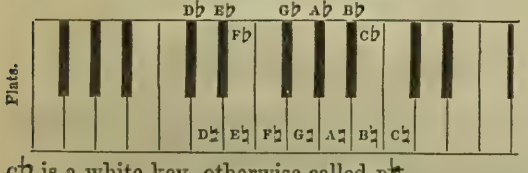


A sharp is one semitone higher than the natural of the same name. Thus A♯ is one semitone higher than A♮, and is a black key lying between A♮ and B♮.



and thus B♯ is a white key otherwise called C♮.

A flat is one semitone lower than a natural. Thus A♭ is the black note lying between A♮ and G♮.



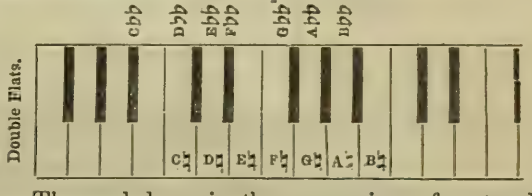
C♭ is a white key, otherwise called B♮.

A double sharp is a whole tone above its corresponding natural. Thus A𝄪 is the white key, otherwise called B♮.

B𝄪 is the black key, otherwise called C♯ or D♭.



A double flat is a whole tone below its corresponding natural. Thus A𝄫 is the white key otherwise called G♮: and F𝄫 is the black key otherwise called E♭ or D♯.



Thorough-bass is the expressing of notes by figures reckoning upwards from the bass. The figures used are 2, 3, 4, 5, 6, 7, 8, and 9.†

A second signifies the next note above or below, according to alphabetical order.‡ Thus the second to § A is B, whether natural, flat or sharp; and that, either the next in position, or in any other octave above it. Thus any B♮, B♭, or B♯ above a given A is called second to it, excepting when written as a ninth. And thus any G♮, G♭, or G♯ below A is called the second below A♮.

A third is the third note inclusive, or next note but one, above or below.

Thus the 3rd	to	A	is	C,	and the 3rd below	A	is F.
... 4th	...	D,	...	4th	...		E.
... 5th	...	E,	...	5th	...		D.
... 6th	...	F,	...	6th	...		C.
... 7th	...	G,	...	7th	...		B.
... 8th, or octave		A,	...	8th	...		A.
... 9th	...	B,	...	9th	...		G.

* The organ and pianoforte are the only instruments now in general use, to which the term *keyed instrument* is meant to be applied in this work.

† 1 is not used, being a unison. 10, 11, 12, &c., are not used, because they are double figures. 3 stands for 3 or 10; 4, for 4 or 11, &c.—See the Author's *Practical Thorough-Bass*, and his *Questions and Answers for Young Students*.

‡ G A, are included in this order, the musical alphabet ending with G, and if produced standing thus—A, B, C, D, E, F, G, A, B, &c.

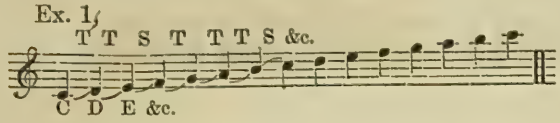
§ The second *to* any note signifies the second *above* it, all intervals being reckoned upwards, from the bass, or lowest note, unless when specified to the contrary. In thorough-bass the figures are always reckoned upwards. Seconds, thirds, &c., are improperly called intervals; they are notes. Their distance from any other note is the interval.

A, in this work, stands for A♮, B for B♮, &c.

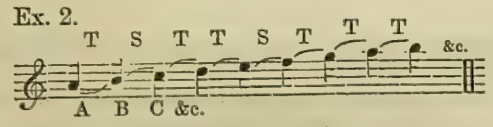
A Scale is a succession of notes repeated an octave higher or lower to an indefinite distance, only terminating with the compass of the instrument.

A Diatonic Scale consists of five tones and two semitones, the latter being separated by two tones and three tones alternately; and the notes being in alphabetical order.*

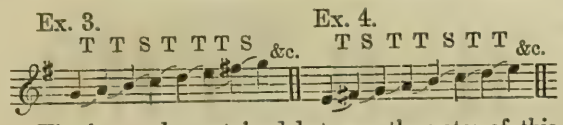
Ex. 1.



Ex. 2.



Ex. 3.



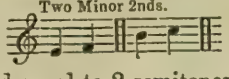
Ex. 4.

The intervals contained between the notes of this scale are, in this work, called Diatonic Intervals; and are as follow:

Two kinds of 2nd—a minor 2nd equal to 1 semitone, as from E to F, or B to C:—

Two Minor 2nds.

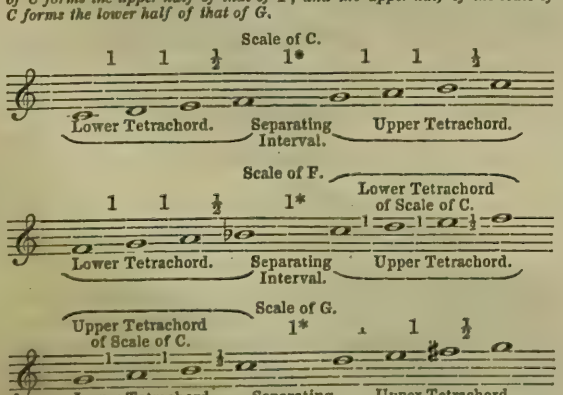
Ex. 5.



and a major 2nd equal to 2 semitones, as from C to D, D to E, F to G, G to A, or A to B:—

* *There is a want of clearness here, arising from the unfortunate ambiguity with which the elementary terms in musical science have long been used. It would be better if the word* tone *were always restricted to its proper meaning of a single musical sound. The symbolical expression by which a tone is represented to the eye, is a* note. *The difference in pitch between any two adjoining tones, is an* interval *or* half interval.

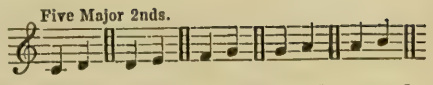
The nature of the Diatonic Scale will perhaps be more easily understood and remembered if it is considered as consisting, in its simplest form, of two tetrachords, or series of four tones each—the intervals between these four tones, in the ascending order, being always two whole intervals followed by half an interval, and the interval between the two tetrachords being always a whole interval. The intervals naturally occur in this order only in the scale of C, which is therefore called the natural *key. In a scale beginning with any other letter, one or more flats or sharps must be used for the purpose of restoring the intervals to their regular order. It should also be observed, that each of the tetrachords in any given scale forms, without any alteration, one of the tetrachords in one of two other scales most nearly related to the original scale; but in the reverse order, i. e., the lower tetrachord of the original scale forming the upper half of the new scale, and vice-versa. Thus, as will be seen in the subjoined example, the lower half of the scale of C forms the upper half of that of F, and the upper half of the scale of C forms the lower half of that of G.*



N.B.—In the examples in this note, the figures 1 *and* ½ *are used to denote the nature of the intervals, instead of the letters T and S.*

Five Major 2nds.

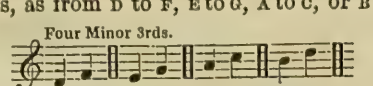
Ex. 6.



Two kinds of 3rd—a minor 3rd† equal to semitones, as from D to F, E to G, A to C, or B to D:—

Four Minor 3rds.

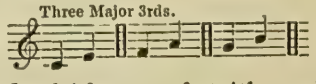
Ex. 7.



and a major 3rd‡ equal to 4 semitones, as from C E, F to A, or G to B:—

Three Major 3rds.

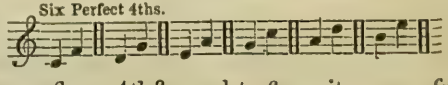
Ex. 8.



Two kinds of 4th—a perfect 4th equal to 5 sem tones, as from C to F, D to G, E to A, G to C, A to or B to E:—

Six Perfect 4ths.

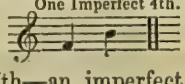
Ex. 9.



and a superfluous 4th§ equal to 6 semitones, as fro F to B:—

One Imperfect 4th.

Ex. 10.



Two kinds of 5th—an imperfect 5th‖ equal to semitones, as from B to F:—

One Imperfect 5th.

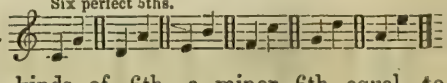
Ex. 11.



and a perfect 5th equal to 7 semitones, as from C G, D to A, E to B, F to C, G to D, or A to E:—

Six perfect 5ths.

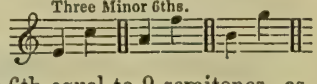
Ex. 12.



Two kinds of 6th—a minor 6th equal to semitones, as from E to C, A to F, or B to G:—

Three Minor 6ths.

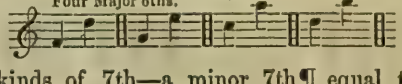
Ex. 13.



and a major 6th equal to 9 semitones, as from F D, G to E, C to A, or D to B:—

Four Major 6ths.

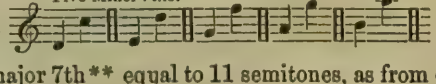
Ex. 14.



Two kinds of 7th—a minor 7th¶ equal to semitones, as from D to C, E to D, G to F, A to G, B to A:—

Five Minor 7ths.

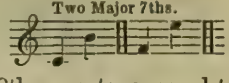
Ex. 15.



and a major 7th** equal to 11 semitones, as from C B, or F to E:—

Two Major 7ths.

Ex. 16.

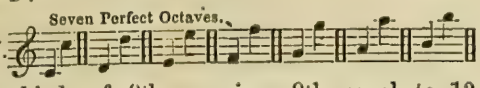


One kind of 8th, or octave, equal to 12 semitone

† Called also a flat third, or lesser third.
‡ Called also a sharp third, or greater third.
§ Called also the extreme sharp 4th, and Tritonus, from the th successive tones FG, GA, and AB, of which it is composed. Sometin also it is called imperfect.
‖ Called also the extreme flat, or false 5th.
¶ Called also a flat 7th.
** Called also a sharp 7th.

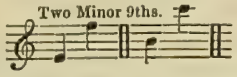
as from C to C, D to D, E to E, F to F, G to G, A to A, or B to B :—

Seven Perfect Octaves.

Ex. 17. 

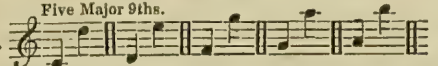
Two kinds of 9th—a minor 9th equal to 13 semitones, as from E to F, or B to C :—

Two Minor 9ths.

Ex. 18. 

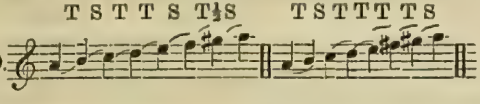
and a major 9th equal to 14 semitones, as from C to D, D to E, F to G, G to A, or A to B :—

Five Major 9ths.

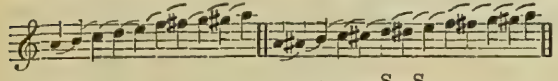
Ex. 19. 

A Chromatic Scale signifies, in this work,* one in which the semitones are placed in any way differently from those in the Diatonic Scale : as,—

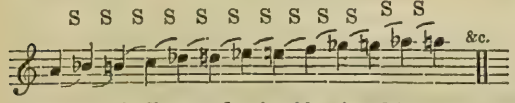
T S T T S T♯S T S T T T S

Ex. 20. 

T S T T S S S S S S S S S S S S



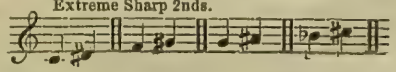
S S S S S S S S S S S S



Chromatic Intervals signify, in this work, those peculiar to the Chromatic Scale ; such are—

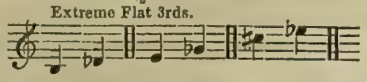
An extreme sharp 2nd, equal to 3 semitones, as from C to D♯, F to G♯, G to A♯, or B♭ to C♯ :—

Extreme Sharp 2nds.

Ex. 21. 

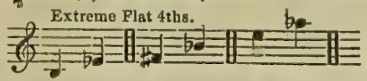
An extreme flat 3rd, equal to 2 semitones, as from B to D♭, E to G♭, or C♯ to E♭ :—

Extreme Flat 3rds.

Ex. 22. 

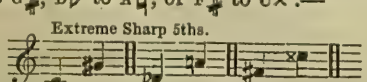
An extreme flat 4th, equal to 4 semitones, as from B to E♭, F♯ to B♭, or E to A♭ :—

Extreme Flat 4ths.

Ex. 23. 

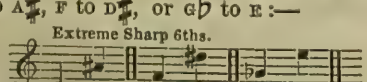
An extreme sharp 5th, equal to 8 semitones, as from C to G♯, D♭ to A♮, or F♯ to C× :—

Extreme Sharp 5ths.

Ex. 24. 

An extreme sharp 6th, equal to 10 semitones, as from C to A♯, F to D♯, or G♭ to E :—

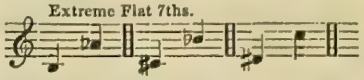
Extreme Sharp 6ths.

Ex. 25. 

* The Chromatic and Enharmonic Scales of the Grecians are to us unintelligible. But it is very remarkable that as the white keys of our instruments give the true Diatonic Scale of the Ancients, so the black keys, when used alone, give a species of Enharmonic Scale found in Chinese and Javanese music, and in some of the Irish and Scotch national airs.

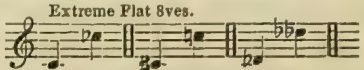
An extreme flat 7th, equal to 9† semitones, as from B to A♭, C♯ to B♭, or D♯ to C :—

Extreme Flat 7ths.

Ex. 26. 

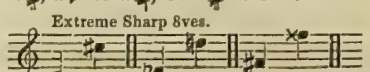
An extreme flat 8ve, equal to 11 semitones, as from C to C♭, C♯ to C♮, or D♭ to D♭♭ :—

Extreme Flat 8ves.

Ex. 27. 

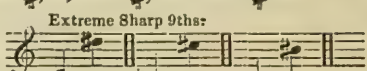
An extreme sharp 8ve, equal to 13 semitones, as from C to C♯, D♭ to D♮, or F♯ to F× :—

Extreme Sharp 8ves.

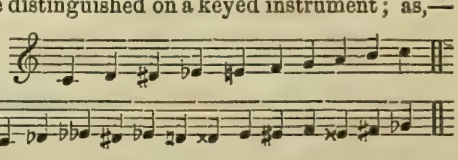
Ex. 28. 

An extreme sharp 9th, equal to 15 semitones, as from C to D♯, B♭ to C♯, or A to B♯ :—

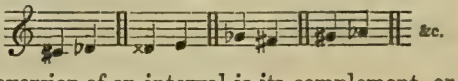
Extreme Sharp 9ths.

Ex. 29. 

An Enharmonic scale contains smaller intervals than semitones, as quarter tones, commas, &c., which cannot be distinguished on a keyed instrument ; as,—

Ex. 30. 

Enharmonic intervals signify such as are peculiar to the Enharmonic scale ; as,—

Ex. 31. 

The Inversion of an interval is its complement, or what is remaining to complete the octave. It is found by changing the place of the two notes which form it, putting the lowest above the other, or the highest below.

Thus the inversion of $\frac{B}{A}$ is $\frac{A}{B}$. The inversion of $\frac{F}{C}$ is $\frac{C}{F}$, &c.

Thus a 2nd inverted is a 7th.
3rd ..... 6th.
4th ..... 5th.
5th ..... 4th.
6th ..... 3rd.
And a 7th ..... 2nd.

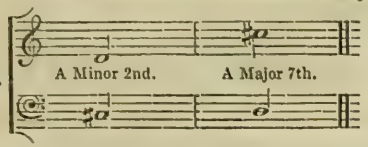
Hence also it follows, that a 5th above is the same note as a 4th below ; a 3rd above as a 6th below ; and a 2nd above as a 7th below. Also that a 5th below is the same note as a 4th above ; a 3rd below as a 6th above ; and a 2nd below as a 7th above.

A minor interval inverted - becomes major.
A major - - - - - - minor.
A perfect - - - - remains perfect.
An imperfect - - - imperfect.
An extreme sharp - becomes extreme flat.
And an extreme flat - extreme sharp.

† Chromatic semitones, as distinct from diatonic semitones, are not noticed in this part of the work, because they are not distinguishable on keyed instruments ; but they will be noticed in the articles Tuning, Temperament, &c.

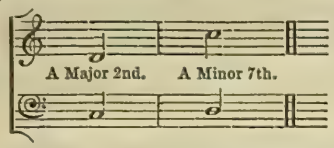
Thus, a minor 2nd inverted becomes a major 7th:—

Ex. 32.



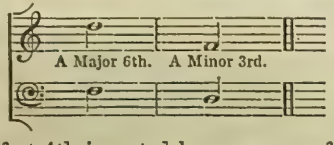
A major 2nd inverted becomes a minor 7th :—

Ex. 33.



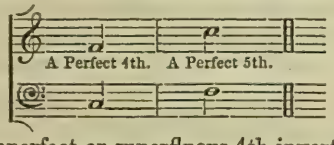
A major 6th inverted becomes a minor 3rd :—

Ex. 34.



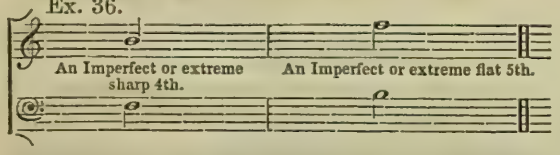
A perfect 4th inverted becomes a perfect 5th :—

Ex. 35.



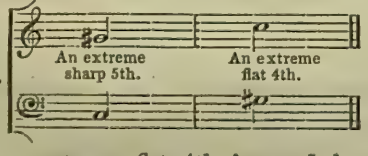
An imperfect or superfluous 4th inverted becomes an imperfect 5th :—

Ex. 36.



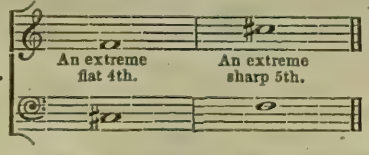
An extreme sharp 5th inverted becomes an extreme flat 4th :—

Ex. 37.



And an extreme flat 4th inverted becomes an extreme sharp 5th :—

Ex. 38.



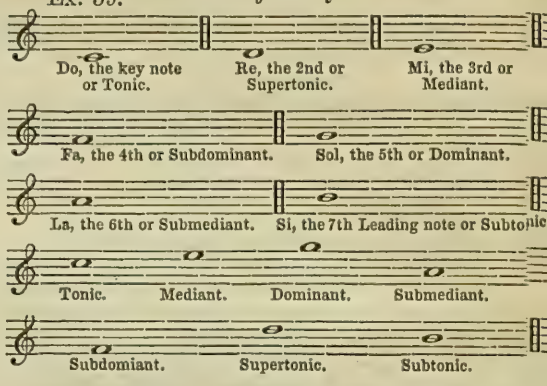
A key, or mode, consists of seven notes, arranged in alphabetical order, called

The key note,	Tonic, or . . .	Do.*
2nd	Supertonic, or . .	Re,
3rd	Mediant, or . .	Mi.
4th	Subdominant, or . .	Fa.†
5th	Dominant, or . .	Sol.
6th	Submediant, or . .	La.‡
7th	Leading Note, Subtonic, or	Si.§

* In this work, as in some others, Do is the key note, Re the 2nd, &c., whatever the key may be, but in France, Re always signifies D; Mi, E, &c.

† The Subdominant is so called from its being the 5th below the key note, as the Dominant is the 5th above. The Dominant is so called from its predominance in Music, being common to the Triads of Do and Sol, and more frequently used than any other note. Do is likewise common to the Triads of Do and Fa, but the triad of Fa is not so often used as that of Sol. Fa is also often used with a $\frac{6}{5}$, Do being omitted.

Ex. 39. The Major Key of C.

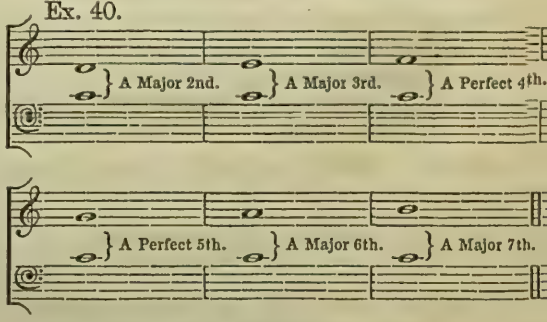


Keys are either major or minor. They are so called according as the 3rd to the key note is major or minor.

In the major key, the intervals, if reckoned from the key note, are all either major or perfect.

Thus, from Do to Re is a major 2nd.
..... Mi is a major 3rd.
..... Fa is a perfect 4th.
..... Sol is a perfect 5th.
..... La is a major 6th.
..... Si is a major 7th.
..... Do is a perfect 8th.

Ex. 40.

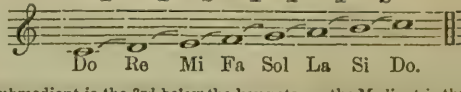


The major key is Diatonic.

From Do to Re is a . tone.
... Re to Mi . tone.
... Mi to Fa semitone.
... Fa to Sol . tone.
... Sol to La . tone.
... La to Si . tone.
... Si to Do semitone.

Viz., two tones and a semitone, and three tones and a semitone; as in the major key of c, which has no flats or sharps :—

Ex. 41.



‡ The Submediant is the 3rd below the key note, as the Mediant is the 3rd above. The Mediant is the middle note between Do and Sol, as the Submediant is between Do and the Fa below it.

§ It is called the leading note, because it generally leads to the key note, *viz.*, is succeeded by it; and the French call it the *sensible* note, as that whereby the key is known.

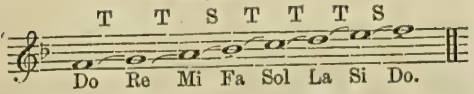
Other major keys are formed on any key note by a similar arrangement of tones and semitones; and, if placed according to the numerical order of their flats and sharps, their key notes will be at the distance of a perfect 5th from each other. Thus G major, which has one sharp, is a 5th above C; D, which has two sharps, is a 5th above G; F with one flat is a 5th below C; B♭ with two flats is a 5th below F, &c., &c., as in the following table:—

FLATS. SHARPS.

10	9	8*	7	6	5	4	3	2	1	0	1	2	3	4	5	6	7*	8	9	10	11	12	13	14
E♭♭	B♭♭	F♭	C♭	G♭	D♭	A♭	E♭	B♭	F	C	G	D	A	E	B	F♯	C♯	G♯	D♯	A♯	E♯	B♯	F×	C×, &c.

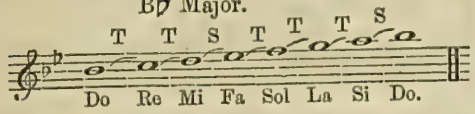
F Major.

Ex. 42.



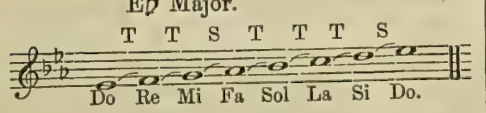
B♭ Major.

Ex. 43.



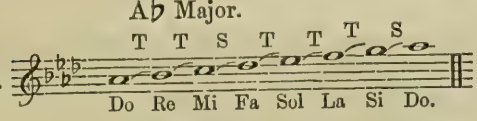
E♭ Major.

Ex. 44.



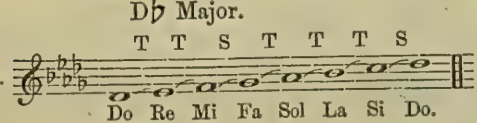
A♭ Major.

Ex. 45.



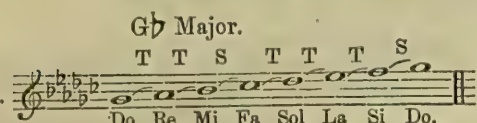
D♭ Major.

Ex. 46.



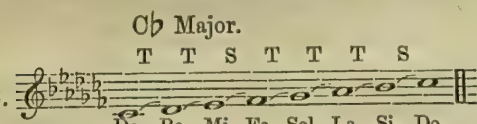
G♭ Major.

Ex. 47.



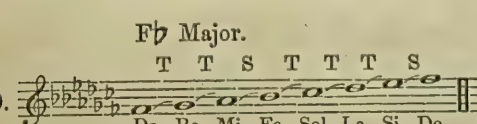
C♭ Major.

Ex. 48.



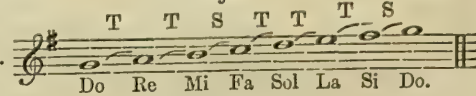
F♭ Major.

Ex. 49.



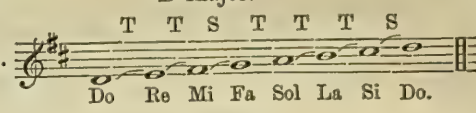
G Major.

Ex. 50.



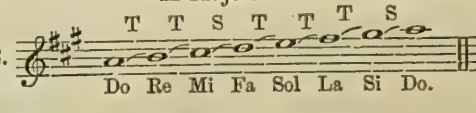
D Major.

Ex. 51.



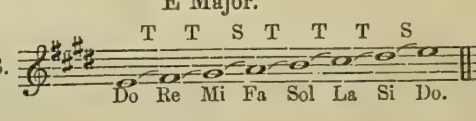
A Major.

Ex. 52.



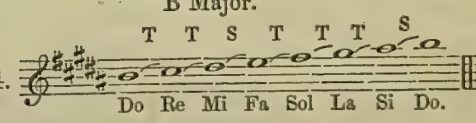
E Major.

Ex. 53.



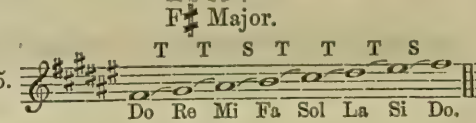
B Major.

Ex. 54.



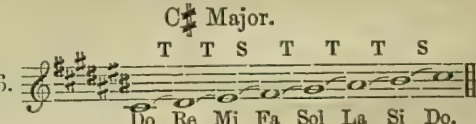
F♯ Major.

Ex. 55.



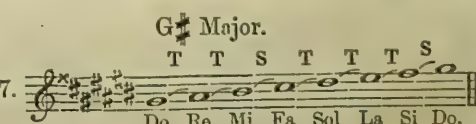
C♯ Major.

Ex. 56.



G♯ Major.

Ex. 57.



Keys which have more than seven sharps or flats are very seldom used.†

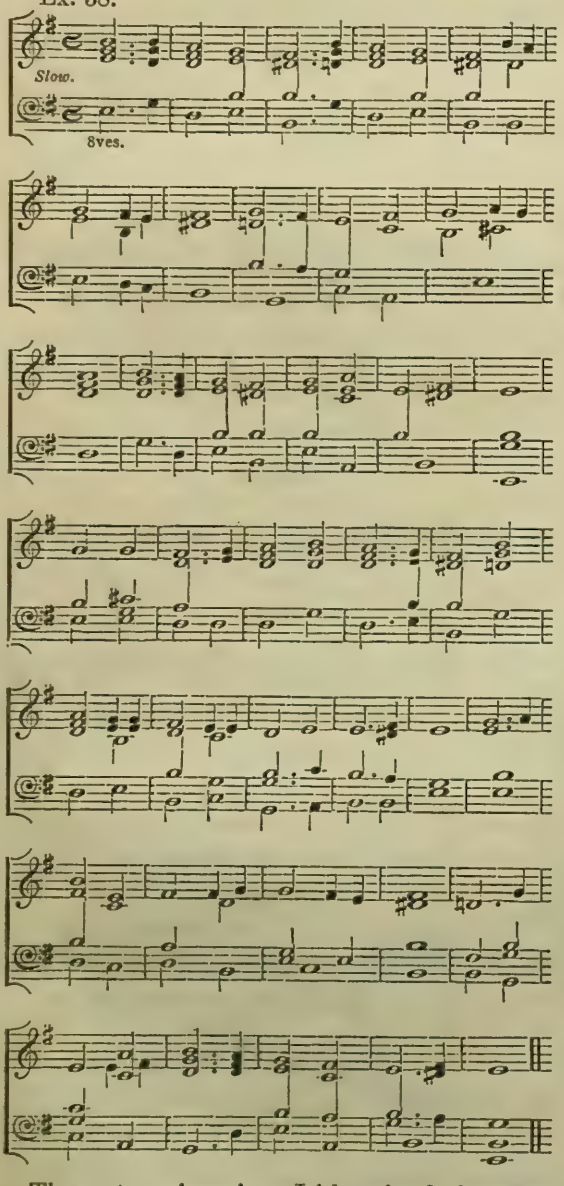
The *ancient* diatonic minor key is so called, in this work, from its being the scale of the ancient Greek Music, and found in the oldest national tunes, in psalms, and cathedral music. It is also represented by the first seven letters of the alphabet, which seems to imply that those who gave these names to this mode considered it as the primary one. Three curious specimens of music composed in this key are here subjoined, from the author's "Specimens of various styles of music adapted to keyed instruments." The first is a Greek composition, set to the first eight verses of the first Pythian Ode of Pindar. The length of the notes in these Odes or Hymns, in the originals, is correspondent to the different feet of the verses, and the

* Keys which have more than seven sharps or flats, have double sharps or flats, which reckon for two.

† Major keys in modern music, as well as minor keys, have occasional accidental flats and sharps, which will hereafter be noticed.

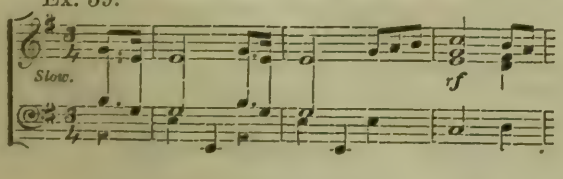
time is therefore perpetually changing from common to triple; but I have followed Dr. Burney's example of reducing them to common time. This tune having but six notes in its melody, seems to favor the idea of its high antiquity, as seven strings were not necessary to its performance on the lyre, which instrument accompanies the second part of the tune.

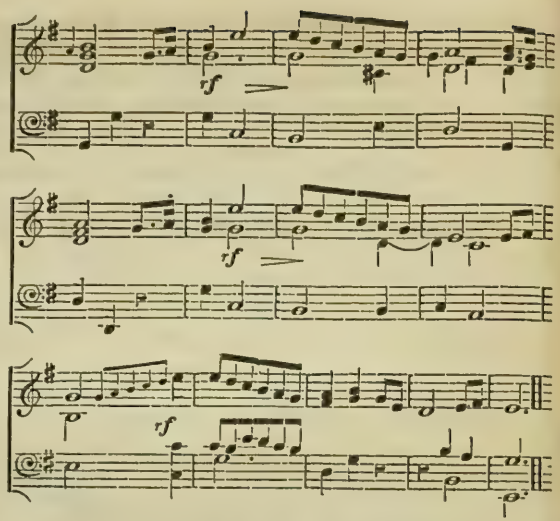
Ex. 58.



The next specimen is an Irish national air, called "Speic Gailleanac," or the Humours of Gailleanac's Country.

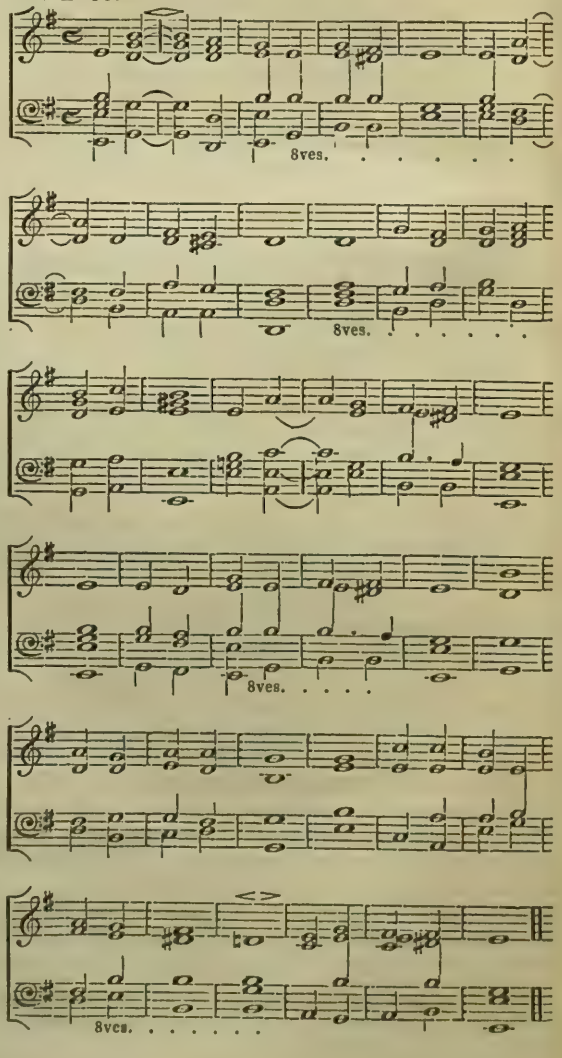
Ex. 59.





And the following is the 38th Psalm, O. V., by an unknown author :—

Ex. 60.



This ancient diatonic minor key nas a minor 3rd, minor 6th, and minor 7th. The other intervals being the same as in the major key.

Thus from *Do* to *Re** is a major 2nd.
..... *Mi* ... minor 3rd.
..... *Fa* ... perfect 4th.
..... *Sol* ... perfect 5th.
..... *La* ... minor 6th.
..... *Si* ... minor 7th.
And thus from *Do* to *Re* is a tone.
..... *Re* to *Mi* ... semitone.
..... *Mi* to *Fa* ... tone.
..... *Fa* to *Sol* ... tone.
..... *Sol* to *La* ... semitone.
..... *La* to *Si* ... tone.
..... *Si* to *Do* ... tone.

Viz., five tones and two semitones, the latter being separated by two tones and three tones alternately, which constitutes a Diatonic Scale, as in the minor key of A, which has no flats or sharps.

The Minor key of A.

Ex. 61.

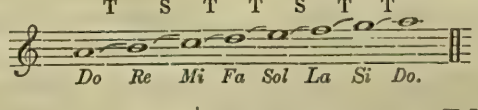


Other minor keys are formed on any key note by a similar arrangement of tones and semitones; and if placed according to the numerical order of their flats and sharps, their key notes will be at the distance of a perfect 5th from each other. Thus E minor has one sharp; B, two sharps; D, one flat, &c., as in the following table :—

FLATS.													SHARPS.										
13	12	11	10	9	8	7	6	5	4	3	2	1	0	1	2	3	4	5	6	7	8	9	10	11
E♭♭	B♭♭	F♭	C♭	G♭	D♭	A♭	E♭	B♭	F	C	G	D	A	E	B	F♯	C♯	G♯	D♯	A♯	E♯	B♯	F×	C×, &c.

T S T T S T T

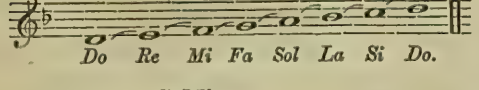
Ex. 62.



D Minor.

T S T T S T T

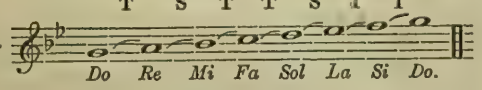
Ex. 63.



G Minor.

T S T T S T T

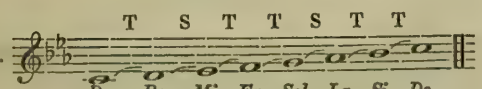
Ex. 64.



C Minor.

T S T T S T T

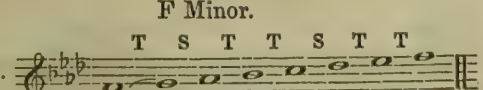
Ex. 65.



F Minor.

T S T T S T T

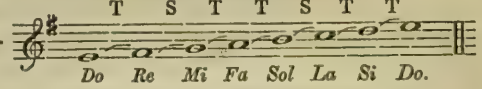
Ex. 66.



E Minor.

T S T T S T T

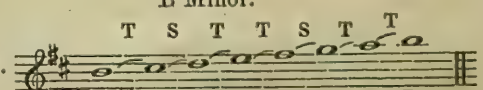
Ex. 67.



B Minor.

T S T T S T T

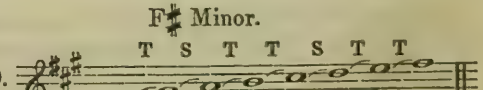
Ex. 68.



F♯ Minor.

T S T T S T T

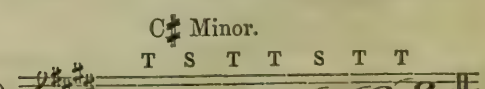
Ex. 69.



C♯ Minor.

T S T T S T T

Ex. 70.

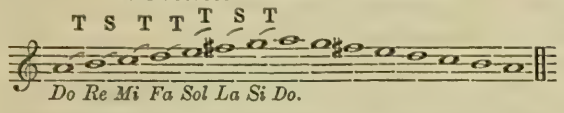


* The syllables *Do*, *Re*, &c., are put in italics in the minor key to distinguish them from those of the major key.

The sixth note *La* and the seventh *Si* are occasionally* raised one semitone. If the sixth is raised (and not the seventh), an ancient diatonic minor key is produced, now become obsolete.

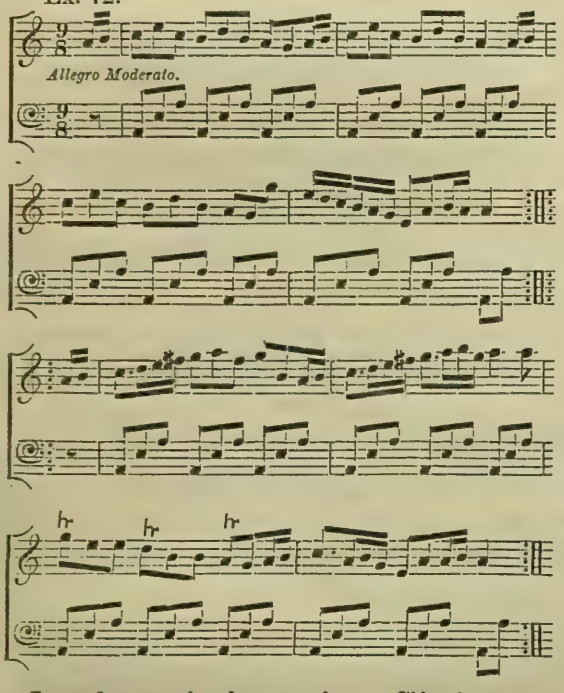
Ex. 71.

An Obsolete Diatonic Minor Scale.



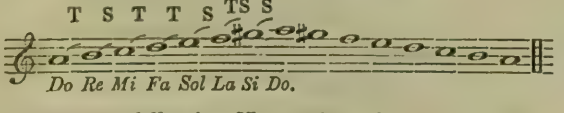
A specimen of this now obsolete key will be found in the subjoined old Irish air, called "The pretty girl milking the cows."

Ex. 72.



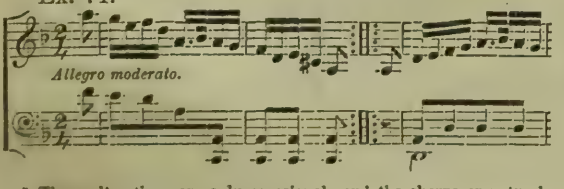
In modern music, the seventh note *Si* is often made one semitone higher, and then the scale of the minor key becomes chromatic.

Ex. 73. A Chromatic Minor Scale.



The two following Norwegian airs are examples of the minor key with the seventh thus sharpened :—

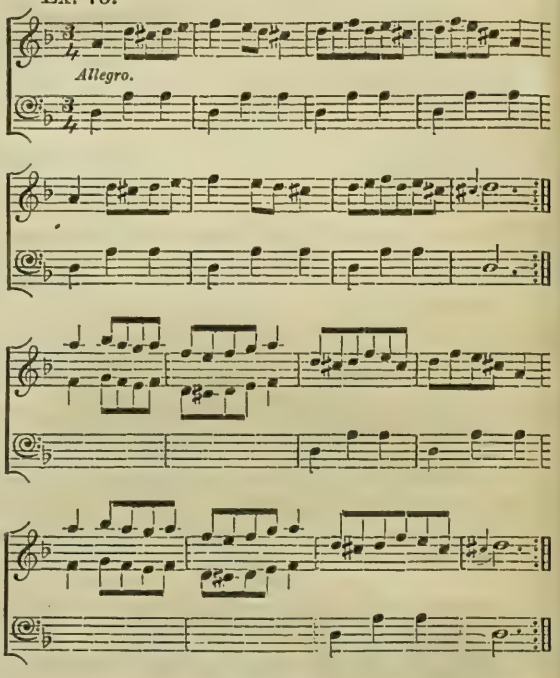
Ex. 74.



* These alterations are only occasional, and the sharps or naturals requisite to produce them are accidental, and not marked at the beginning of the piece. The third note of the minor key is sometimes also altered. See note, page 14.

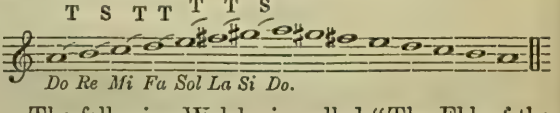


Ex. 75.



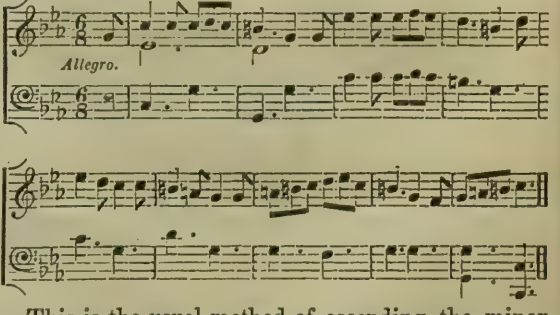
The sixth and seventh notes are both occasionally altered at the same time, and then also the scale is chromatic.

Ex. 76. Another Chromatic Minor Scale.



The following Welch air, called "The Ebb of the Tide," furnishes an example of this scale :—

Ex. 77.



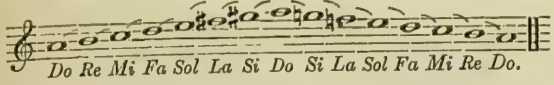
This is the usual method of ascending the minor key, but in descending, the ancient diatonic scale is commonly used.†

† The melody of the minor key depends, however, in a great measure, on the harmony.

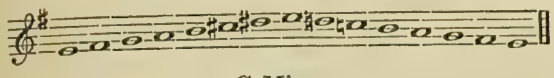
The usual manner of ascending and descending the Minor key.

Ex. 78.

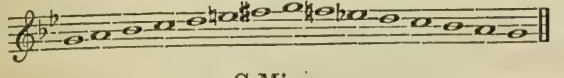
T S T T T T S T T S T T S T



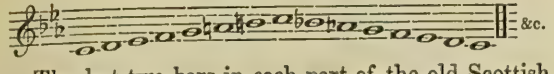
E Minor.



G Minor.

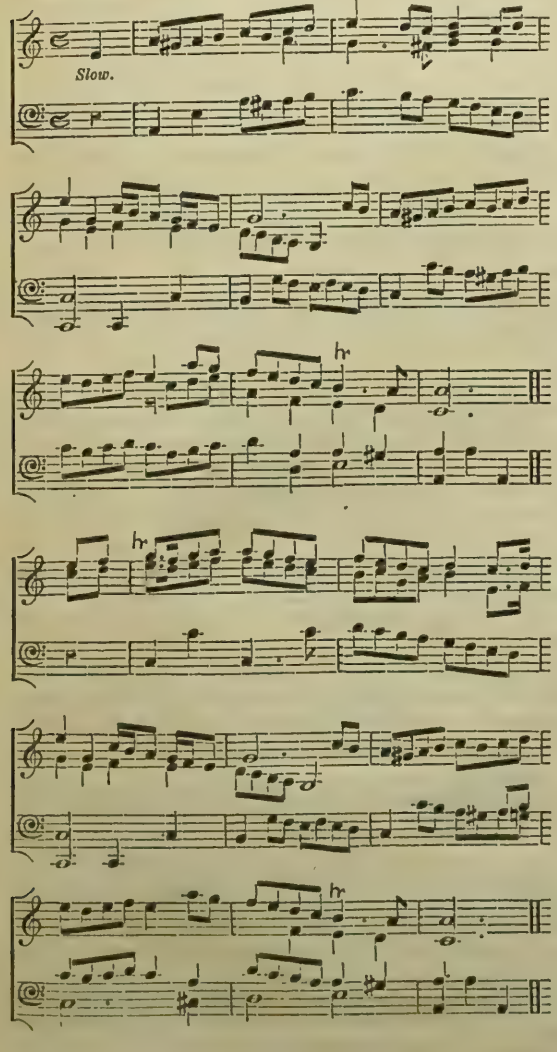


C Minor.



The last two bars in each part of the old Scottish air, "Gilderoy," shew the use of the ancient minor diatonic scale in descending passages :—

Ex. 79.



CHAPTER II.

Of Concords.

Harmony is a succession of Chords,* either fully expressed, or partly understood.

A Chord is a coincidence of sounds, and is either a concord or a discord.

A Concord is a coincidence of two, or at most of three different notes, none of which are next to each other, as to their alphabetical order,† and none of which form an extreme flat or sharp interval.

Thus, $\overset{G\ A}{E,\ F}$, &c., are concords. $\overset{F\ G\ B}{D,\ D,\ G}$, &c., are $\overset{C\ D}{\ }$ $\overset{B\ C\ F}{\ }$ discords.

A triad is any note accompanied with its third and fifth. Consonant triads are such as have no imperfect interval; or, in other words, such as are concords. In Dissonant triads the fifths are not perfect, and they are consequently discords.‡ A major triad is so called from its third being major, and a minor triad from its third being minor.

There are six consonant triads in a diatonic scale, and one dissonant. Thus in the scale of naturals

$\overset{G\ A\ B\ C\ D\ E}{E,\ F,\ G,\ A,\ B,\ C,}$ are consonant triads. $\overset{F}{D}$ is dissonant. $\overset{C\ D\ E\ F\ G\ A}{\ }$ $\overset{B}{\ }$

The triad is called by the name of its lowest note.

Thus $\overset{G}{E}$ is the triad of C, and the triad of G is $\overset{D}{B}$, &c. $\overset{C}{\ }$ $\overset{G}{\ }$

Of the above six triads three are major and three minor. The triads of C, F, and G, are major; those of D, E, and A, are minor.

Every diatonic scale, on a keyed instrument,§ may be considered as comprehending two keys, the one major and the other minor, both having the same number of flats and sharps. Thus the scale of naturals includes the keys of C major and A minor. A scale with one sharp includes G major and E minor. A scale with three flats includes E♭ major and C minor, &c., and this minor key is called relative minor to the major key; and the major key, relative major to the minor key.

The three major triads belong to the major key, and the three minor triads to the minor key, and are the triads of Do, Fa, and Sol in each.

Thus in the scale of naturals, the triads of C, F, and G, belong to the major key of C, and are the triads of Do, Fa, and Sol; and the triads of A, D, and E, belong to the minor key of A, and are the triads of *Do*, *Fa*, and *Sol*.

* It has been objected to this definition, that a single concord produces harmony, but I have retained it, as no piece of music consists of only one chord.

† See note, page 5.

‡ Dissonant triads, such as $\overset{F\ C\sharp}{D,\ A,}$ &c., will be treated of hereafter. $\overset{B\ F}{\ }$

§ But this is only the case on keyed instruments, for nature requires smaller intervals than semitones for the union of a major and its relative minor key, which, therefore, constitutes a kind of enharmonic scale.

Ex. 80.



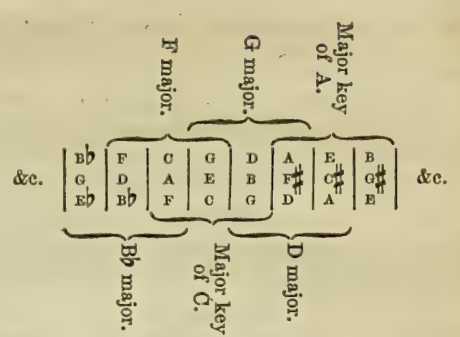
As thus, in C major, $\overset{C\ G\ D}{A,\ E,\ B.}$ And thus, in A minor, $\overset{A\ E\ B}{F,\ C,\ G.}$ $\overset{D\ A\ E}{}$

$\overset{F\ C\ G}{\text{Fa Do Sol}}$

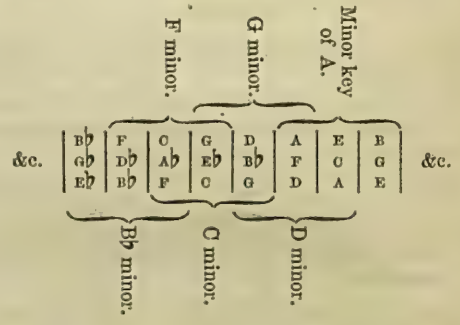
Fa Do Sol

They are placed in this order because *Fa* the subdominant is the 5th below *Do*, as *Sol* the dominant is the 5th above.

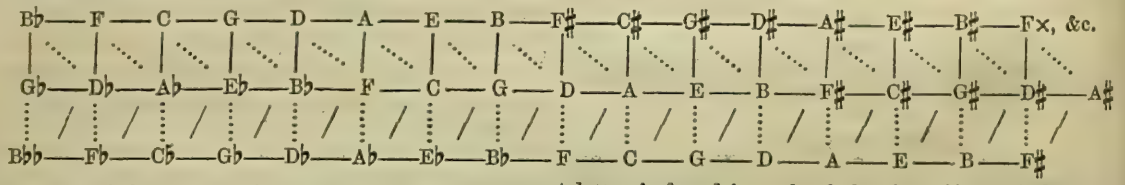
Hence it appears that a key consists of a key note with its third and fifth, together with the key notes next to it (*viz.*, the dominant and subdominant), with their thirds and fifths, as in the following table :—



And so also in the minor keys, as in the following table :—



But as the very same notes are repeated in the above table, the following is preferable, in which the horizontal mark — signifies a fifth; the perpendicular | or oblique ⁄, signifies a major third; and the dotted line ⋮ or ⋱, a minor third.



The middle row consists of key notes, excepting the first note and the last two notes, the upper row of major thirds to those notes, and the lower of minor thirds to them. Thus a major triad is any note with its major third and fifth, as $\overset{E}{|\ \diagdown\!\diagdown\ \diagdown\!\diagdown\ |}$ $\underset{C\text{—}G}{}$ in which E is major third to C, G is the fifth, and from E to G is a minor third; and a minor triad is thus expressed, $\overset{C\text{—}G}{\vdots\ /}$ $\underset{E\flat}{}$

A major key consists of three major triads, as for instance that of C major, thus, $\overset{A\text{—}E\text{—}B}{|\ \diagdown\!\diagdown\ |\ \diagdown\!\diagdown\ |\ \diagdown\!\diagdown\ |}$ $\underset{F\text{—}C\text{—}G\text{—}D}{}$ and a minor key consists of three minor triads, as for instance that of A minor, thus, $\overset{D\text{—}A\text{—}E\text{—}B}{\vdots\ /\ \vdots\ /\ \vdots\ /}$ $\underset{F\text{—}C\text{—}G}{}$ A minor key consists occasionally of both minor and major triads, as $\overset{F\sharp\text{—}C\sharp\text{—}G\sharp}{|\ \diagdown\!\diagdown\ |\ \diagdown\!\diagdown\ |\ \diagdown\!\diagdown\ |}$ $\underset{D\text{—}A\text{—}E\text{—}B}{\vdots\ /\ \vdots\ /\ \vdots\ /}$ $\underset{F\text{—}C\text{—}G}{}$ * and though the same letter is found in each of the three lines of the foregoing table, (as C, in the upper line, the third to A♭, C, in the middle line, the key note, and C, in the lower line, the minor third to the key note A), yet none of the notes contained in one line are the same as those contained in either of the others,† but differ from them in a slight degree, as the student will perceive when he comes to study tuning.

From the foregoing table it appears that in order to perform fourteen major and minor keys accurately in tune, forty-nine different notes should be contained in every octave, for twelve keys forty-three notes, &c., &c., *viz.*, ten notes for one major and minor key, and three more notes for every additional key.‡

* The triad of *Sol* in the minor key is frequently made a major triad. See Cadences. The triad of *Fa* is sometimes made a major triad, especially if followed by the major triad of *Sol*. See Chromatic Successions. The triad of *Do* is also occasionally made major. See Full Close.

† *Viz.* Supposing that the key note of every major and minor key is one sound common to both keys; that the note C is key note to both C major and C minor; A to A major and A minor, &c. Some theorists, however, construct the minor key on the sixth note of the relative major key: thus making the key note of A minor different from that of A major, but the same sound with A in the key of C major or F major.

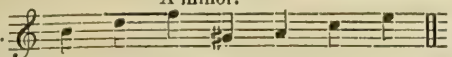
‡ Here it may be allowed to teach the student how to know in what key any piece, or any part of a piece of music, is written. In melody alone, the key is known by its leading note; but where there is harmony, it is chiefly known by the triads. The former method is liable to many exceptions, and is very uncertain, but the latter is comparatively easy and clear.

In melody (without harmony), to find the leading note of a piece of music, or of any passage contained in any piece, let a table of leading notes standing a fifth from each other be extended to any required length, as follows :—

B♭ F C G D A E B F♯ C♯ G♯ D♯ A♯ E♯ B♯ F× C×, &c.

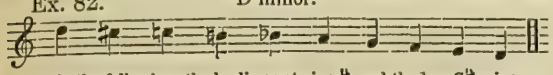
Take the seven or more different notes of which the passage consists, and that note which stands latest in the foregoing table is the leading note of the key. Thus let it be required to know in what key the following notes are:—

A minor.

Ex. 81. 

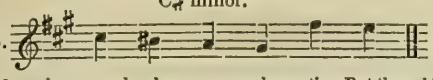
By looking for them in the foregoing table, they will be found in the following order,—F C D A E B G♯; G♯ therefore is the leading note, and as the key note is always one semitone higher than the leading note (see Note, p. 8), the key must be A, the third to A is C, and being a minor third, the key is A minor. In the next example, the leading note is C♯, and the key D minor:—

Ex. 82. D minor.

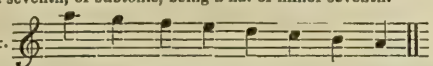


And in the following, the leading note is B♯, and the key C♯ minor:—

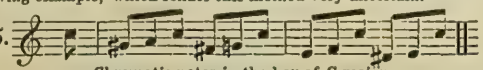
C♯ minor.

Ex. 83. 

All the foregoing examples, however, are chromatic. But the subjoined passage is diatonic, and may either be the key of C major (B being the leading note) or the ancient diatonic key of A minor without any leading note; the seventh, or subtonic, being a flat or minor seventh.

Ex. 84. 

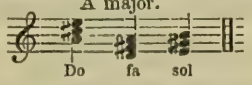
But besides the difficulties which occur whenever the scale is diatonic, there are others owing to chromatic passages and ornamental notes, as in the following example, which render this method very uncertain.

Ex. 85. 

Chromatic notes in the key of C major.

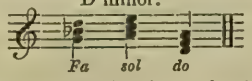
But in harmony wherever the triads are clearly distinguishable (and, in this work, every combination will be derived from them), the key will be easily known. Thus three major triads, standing a fifth from each other, will constitute a major key; as the three, in this passage, constitute the key of A major:—

A major.

Ex. 86. 

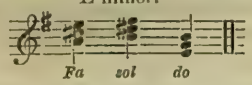
And three minor triads, at a fifth from each other, form a diatonic minor key; as those in the next example form the key of D minor:—

D minor.

Ex. 87. 

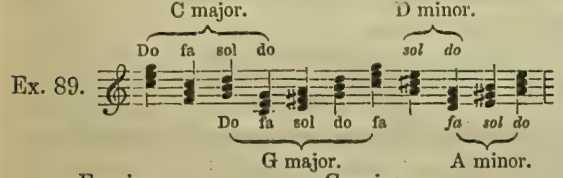
In chromatic minor keys, when there is one minor triad and two major, the latter being a second from each other, the minor triad is that of *Do*; as in the passage subjoined, where the key is E minor:—

E minor.

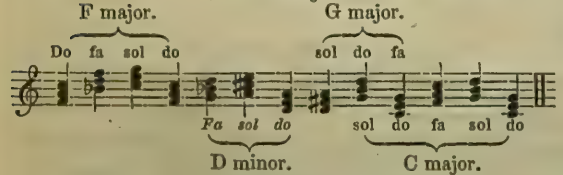
Ex. 88. 

The following example contains a series of triads in various keys. The triads bearing two names, as Sol in one key, and Do in another, are called doubtful chords; and will be explained hereafter.

C major. D minor.

Ex. 89. 

F major. G major.



Successions of triads are either diatonic or chromatic. Diatonic successions of triads are either simple or mixed.

Simple Diatonic Successions.

The three major triads of the major key, with the three minor triads of the relative minor key, forming one diatonic scale on a keyed instrument (page 13), a succession of these in any order, and for any length of time, is allowable; and when the order is regular, the succession is, in this work, called a simple diatonic succession of triads.

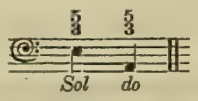
As some of these are become obsolete, and those still used are not all equally agreeable, it is necessary to treat of them separately.

They may be divided into such as move a fifth, a third, and a second; or their inversions, a fourth, a sixth, and a seventh. See page 7. There are six simple diatonic successions, *viz.*,

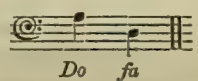
1st.—Falling 5ths, or rising 4ths, which is the same thing.*
2nd.—Rising 5ths, or falling 4ths.
3rd.—Falling 3rds, or rising 6ths.
4th.—Rising 3rds, or falling 6ths.
5th.—Falling 2nds, or rising 7ths.
7th.—Rising 2nds, or falling 7ths.

First Simple Diatonic Succession: falling fifths or rising fourths. Any triad, except Fa, may fall a fifth, or rise a fourth; Fa cannot, because the fifth below, or the fourth above Fa, is the dissonant triad.

Thus the triad of *Sol* may be succeeded by that of *Do*:—

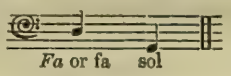
Ex. 90. 

The triad of *Do* may be succeeded by that of *Fa*:

Ex. 91.  †

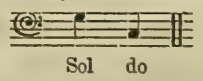
Do fa

And the triad of *Fa*‡ may be succeeded by that of Sol:—

Ex. 92. 

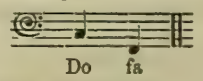
Fa or fa sol

The triad of Sol may be succeeded by that of Do:

Ex. 93. 

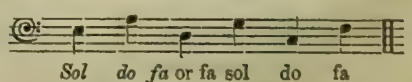
Sol do

The triad of Do may be succeeded by that of Fa:

Ex. 94. 

Do fa

Any two or more of these may be used together; as—

Ex. 95. 

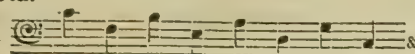
Sol do *fa* or fa sol do fa

* The composer may rise 5ths or fall 4ths alternately, or when he pleases; and so of the rest.

† When no figures are put over the bass note in thorough bass, $\frac{5}{3}$ is understood and is to be performed.

‡ When *Fa* is succeeded by either of the triads of the major key, it is more properly considered as an inversion of Fa with a 6th in the major key. See Gradual Modulation, added Sixth, &c., for the lowest note of a triad is not always the fundamental note.

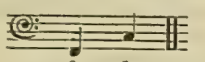
Some composers have introduced the dissonant triad into this succession only. In which case it is considered as an inversion of *Fa* with a 6th. See added 6th.

Ex. 96. 

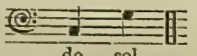
do fa *fa* *sol* *do* *fa* or fa sol do

Second Simple Diatonic Succession: rising fifths or falling fourths. Any triad, except *Sol*, may rise a fifth, or fall a fourth; *Sol* cannot, because the fifth above, or fourth below *Sol*, is the dissonant triad.

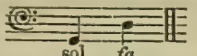
Thus the triad of Fa may be succeeded by that of Do:—

Ex. 97. 
fa do

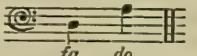
The triad of Do may be succeeded by that of Sol:

Ex. 98. 
do sol

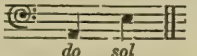
The triad of Sol may be succeeded by that of *Fa*:

Ex. 99. 
sol *fa*

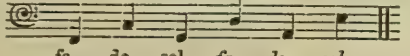
The triad of *Fa* may be succeeded by that of *Do*:

Ex. 100. 
fa *do*

The triad of *Do* may be succeeded by that of *Sol*:

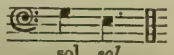
Ex. 101. 
do *sol*

Any two or more of these may be used together:—

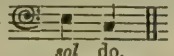
Ex. 102. 
fa do sol *fa* *do* *sol.*

Third Simple Diatonic Succession: falling thirds or rising sixths. Any triad, except *Fa*, may fall a third, or rise a sixth; *Fa* cannot, because the third below, or sixth above, is the dissonant triad.

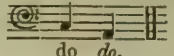
Thus the triad of Sol may be succeeded by that of *Sol*:—

Ex. 103. 
sol *sol.*

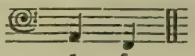
The triad of *Sol* may be succeeded by that of Do:

Ex. 104. 
sol do.

The triad of Do may be succeeded by that of *Do*:

Ex. 105. 
do *do.*

The triad of *Do* may be succeeded by that of Fa:

Ex. 106. 
do fa

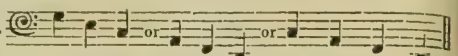
The triad of Fa may be succeeded by that of *Fa*:

Ex. 107. 
fa *fa*

but the two first are peculiar to ancient music.*

* By *ancient music* is meant that of the fifteenth, sixteenth, and seventeenth centuries. This is to be carefully distinguished by the student from *the music of the ancients, viz.*, of the Greeks, Romans, and other ancient nations.

Hence though any two or more of these examples *may* be used together; yet a combination of the three latter is, in general, to be preferred; especially in modern music:— †

Ex. 108. 

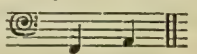
sol *sol* do *do* fa *fa* do *do* fa *fa*

Fourth Simple Diatonic Succession: rising thirds or falling sixths. Any triad, except Sol, may rise a third or fall a sixth; Sol cannot, because the third above, or sixth below Sol, is the dissonant triad.

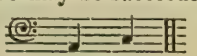
Thus the triad of *Fa*‡ may be succeeded by that of Fa:—

Ex. 109. 
fa or fa fa

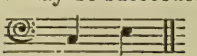
The triad of Fa may be succeeded by that of *Do*:

Ex. 110. 
fa *do*

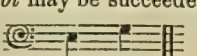
The triad of *Do* may be succeeded by that of Do:

Ex. 111. 
do do

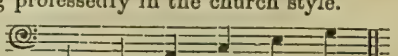
The triad of Do may be succeeded by that of *Sol*:

Ex. 112. 
do *sol*

The triad of *Sol* may be succeeded by that of Sol:

Ex. 113. 
sol sol

But as these are all peculiar to ancient music, the student is recommended to avoid them; unless he is writing professedly in the church style.

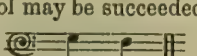
Ex. 114. 
fa fa *do* do *sol* sol

Fifth Simple Diatonic Succession: falling seconds or rising sevenths. Any triad, except Do, may fall a second or rise a seventh; Do cannot, because the second below, or seventh above Do, is the dissonant triad.

Thus the triad of *Do* may be succeeded by that of Sol:—

Ex. 115. 
do sol

The triad of Sol may be succeeded by that of Fa:§

Ex. 116. 
sol fa

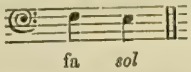
† The student may observe, that what he is cautioned to avoid in the *simple, may* be used with good effect in the *mixed* successions; also, that what he is to avoid in the *modern*, is highly proper for the *ancient* style of music. See the Author's *Lectures on Music.*

‡ Or rather Fa with a 6th, inverted. See Note, p. 15.

§ The succession from Sol to Fa is by no means so common as from Sol to Do, or to *Do.*

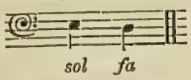
The triad of Fa may be succeeded by that of *Sol:*

Ex. 117.



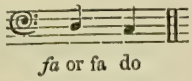
The triad of *Sol* may be succeeded by that of *Fa:*

Ex. 118.



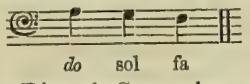
The triad of *Fa* (or rather Fa) may be succeeded by that of Do:—

Ex. 119.



But the three latter examples are only fit for church music. Hence a combination of the two former is to be preferred to one of the three latter.

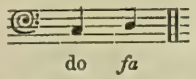
Ex. 120.



Sixth Simple Diatonic Succession: rising seconds or falling sevenths. Any triad, except *Do*, may rise a second or fall a seventh; *Do* cannot, because the second above, or seventh below *Do*, is the dissonant triad.

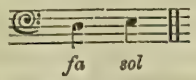
Thus the triad of Do may be succeeded by that of *Fa*:—

Ex. 121.



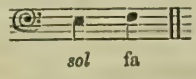
The triad of *Fa* may be succeeded by that of *Sol:*

Ex. 122.



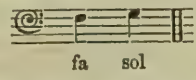
The triad of *Sol* may be succeeded by that of Fa:

Ex. 123.



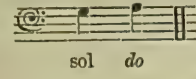
The triad of Fa may be succeeded by that of Sol:

Ex. 124.



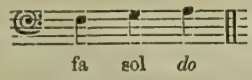
The triad of Sol may be succeeded by that of *Do:*

Ex. 125.



The three former of these examples are only fit for the church style. Hence a combination of the two latter is generally to be preferred to one of the three former.*

Ex. 126.



Of the foregoing successions the first and second, as Examples 95, 96, 102, are the most agreeable to the ear; and should be most frequently used. The next to be preferred is part of the third succession, as Example 108; then part of the sixth, as Example 126; and lastly, part of the fifth, as in Example 120.

* From *Fa* to $\overset{\sharp}{Sol}$, and from $\overset{\sharp}{Sol}$ to Fa, is a good succession. See Chromatic successions.

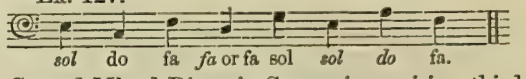
Mixed Diatonic Successions.

The different ways of combining or mixing these simple diatonic successions are very numerous.

The five following mixed successions are selected from these, and may be denominated Mixed Diatonic Successions.

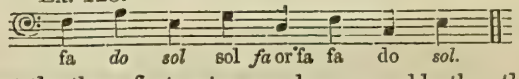
First Mixed Diatonic Succession: falling thirds and fifths alternately, or rising sixths and fourths. Thus the triads of *Sol,* Do, Fa, *Fa* (or rather Fa, see note, page 16), Sol, *Sol, Do,* Fa may succeed each other, but the first note *Sol* is generally omitted.†

Ex. 127.



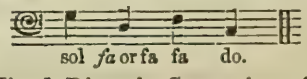
Second Mixed Diatonic Succession: rising thirds and fifths alternately, or falling sixths and fourths. Thus the triads of Fa, *Do, Sol,* Sol, *Fa* (or Fa), Fa, Do, *Sol,* may succeed each other:—

Ex. 128.



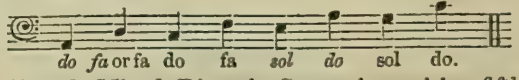
but the three first notes are less agreeable than the next four, and the last note *Sol* is generally omitted.‡

Ex. 129.



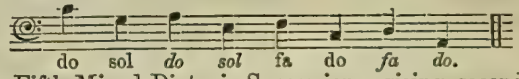
Third Mixed Diatonic Succession: falling fifths and seconds alternately, or rising fourths and sevenths alternately. Thus the triad of *Do, Fa,* (or rather Fa), Do, Fa, *Sol, Do,* Sol, Do, may succeed each other.

Ex. 131.



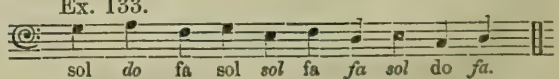
Fourth Mixed Diatonic Succession: rising fifths and seconds alternately, or falling fourths and sevenths alternately, Thus the triads of Do, Sol, *Do, Sol,* Fa, Do, *Fa, Do,* may succeed each other.

Ex. 132.



Fifth Mixed Diatonic Succession: rising seconds and falling thirds alternately, or falling sevenths and rising sixths alternately. Thus the triads of Sol, *Do,* Fa, Sol, *Sol,* Fa, *Fa, Sol,* Do, *Fa,* may succeed each other.

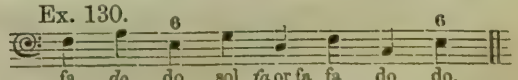
Ex. 133.



† This succession is sometimes extended and rendered endless, by adding the dissonant triad and that of Sol to it. The dissonant triad, if followed by a chord in the minor key, is derived from *Fa,* with a 6th (see added 6th), and when followed by one in the major key, it is derived from the discord of Sol. See Dominant 7th.

‡ The bass notes of this succession are often found in music, but not accompanied with a fifth and third to each note, the note *Sol* having a sixth and third to it, which is an inversion of the triad of Do; it becomes therefore, in this case, an irregular mixed diatonic succession, in the following example:—

Ex. 130.

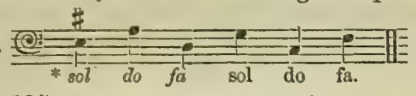


Chromatic Successions.

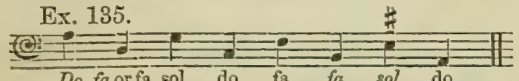
A Chromatic Succession implies an alteration of the triads, from minor to major, in the minor key, occasioned by the occasional alterations of the 6th, 7th, and 3rd notes of the minor key, page 12.

Thus the triad of *Sol* is frequently made major before or after the minor triad of *Do*, in the first simple succession; as in the following examples :—

Ex. 134.

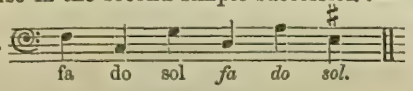


Ex. 135.



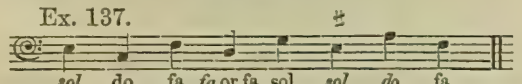
the scale of which is thus rendered chromatic. This occurs also in the second simple succession :—

Ex. 136.



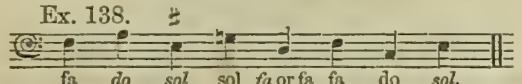
in the first mixed succession :—

Ex. 137.



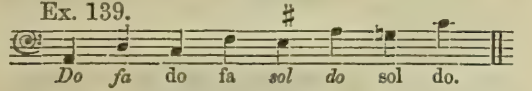
in the second mixed succession :—

Ex. 138.



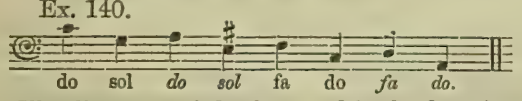
in the third mixed succession :—

Ex. 139.



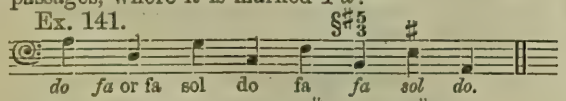
and in the fourth mixed succession.

Ex. 140.

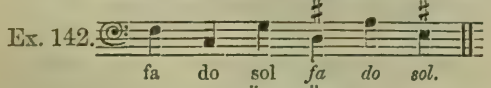


The dissonant triad, when used in the first simple diatonic succession, is derived from *Fa* with a sixth, inverted as *Re* with a third and a fifth. See Example 96.† The third to *Fa* is often major in a minor key. See Example 88. Thus *Fa* with a sharp third and sixth, when inverted, becomes *Re* with a third and sharpened fifth, as in the following passages, where it is marked *Fa* :—

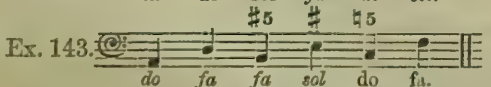
Ex. 141.



Ex. 142.



Ex. 143.



* A natural, sharp, or flat, thus placed over a bass note in thorough-bass, signifies that the note which is 3rd to the bass note is to be accordingly natural, sharp, or flat.

† See Inversions of the Triad at the conclusion of the present chapter; see also Discord of Fa in the third chapter.

§ A sharp, natural or flat, placed before a figure, shows that the note represented by that figure is to be accordingly natural, sharp, or flat: thus in the instance above, the 5th to B (viz. F) is to be sharp.

The first of these examples is the first succession, but the transition from Fa to *Fa* is not agreeable. See added 6th.

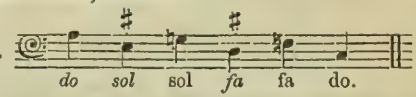
Fa may have a major third in the second succession, as in the second of the preceding examples. The first mixed succession may be used in the minor key by using *Re* with a sharpened 5th and minor 3rd, as the inversion of *Fa* with a sharp 3rd and 6th, as in the last example : the transition, however, is not pleasing. It is better to use the major triad of *Fa*, thus :—

Ex. 144.



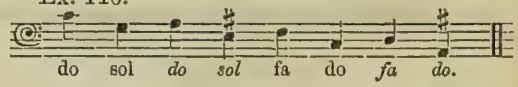
The major triad of *Fa* may be used in the second mixed succession, thus :—

Ex. 145.



The triad of *Do* is sometimes major, especially after *Fa*, as in the subjoined passage, and in Cadences; in this example the triad of *Sol* may be either major or minor.

Ex. 146.



Accompaniment.

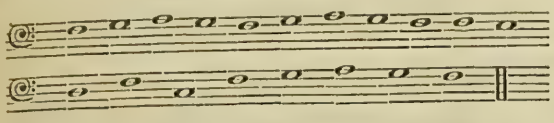
In the foregoing successions, the fundamental notes only have been written, the accompaniment, or third and fifth to each bass note being only expressed by figures, which is called the thorough bass. For the manner of writing and performing this accompaniment, both in parts and on a keyed instrument, I shall now give rules, which will not only apply to successions of triads, but to every other part of composition.

Several composers (generally, however, from oversight) have left violations of these rules in their works. Dominico Scarlatti was perhaps the only one who professedly disregarded them for the sake of producing good effects. But whatever may have been the success of this great master, the passages, in which he has transgressed the rules, do not appear to have become the objects of imitation to other composers.

The method of accompanying the Chants of the Christian Church, by a succession of fifths, octaves, or fourths, used in and before the eleventh century, called Organum, has been supposed to be the origin of harmony. The organ took its name from it; and the stops called cornet, sexquialtera, twelfth, tierce, principal, fifteenth, &c., are thought to have been invented to facilitate the performance of this accompaniment. But if the effect of this accompaniment was similar to that of the above stops of an organ, if, by being performed comparatively soft, it only enriched the tone, without disturbing the melody, then it should not be considered as the origin of harmony, having no more to do with it than the harmonics which constantly accompany the melody of a single voice or instrument. The invention of harmony may

be said rather to have commenced when these fifths, fourths, and octaves began to be *avoided*. Some examples of the mode of accompaniment here referred to, will be found in the following plain chant and its accompaniment, by Guido, 1022, from the author's Specimens of various styles of Music, vol. 2:—

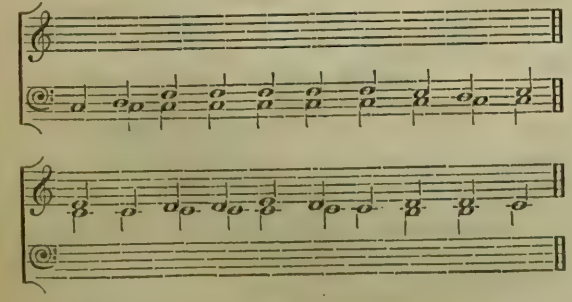
Plain Chant.



Organum or Diaphonic, by Guido, 1022.



The following specimens of harmony are also by Guido, in the latter of which a nearer approach is made to the modern system:—



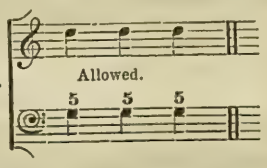
Rule 1st.* Two† consecutive perfect‡ fifths must not take place between the same parts.§

Thus, for instance, in a succession of any two chords, the part which is fifth to any other part in the one chord, must not be fifth to the same part in the next chord. Thus if the treble is fifth to the bass in one chord, it must be eighth or third, and not fifth, in the next; or, if the treble is fifth to the inner part, or the inner part fifth to the bass, or one inner part fifth to another, the same rule is to be observed. The following are examples of violations of this rule:—

* This rule is the most strict of any in music. The designed violations of it very rarely occur; they are sometimes met with in old madrigals by contrary motion, as in Ex. 152; but, having been exploded by modern composers, the rule should be most strictly adhered to by the student.

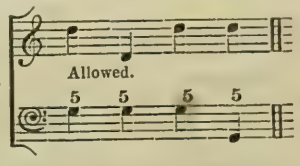
† The repetition of the same notes in fifths, thus,—

Ex. 147.



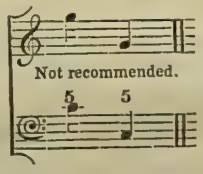
is not considered as a violation of this rule; also if one part moves in octaves, while the other repeats the same note, thus,—

Ex. 148.



the rule is not violated: but if both parts move in octaves at once, remaining a fifth to each other, as,—

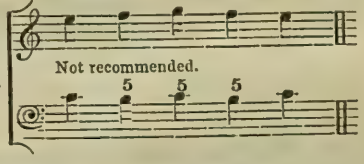
Ex. 149.



the rule is broken.

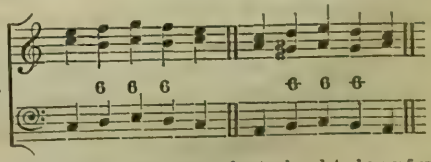
‡ A perfect fifth may follow or be followed by an imperfect one; not, however, between the treble and bass parts, as,—

Ex. 150.



but between the treble and some of the inner parts (see the following note); no other succession of a perfect and imperfect 5th being allowable; thus:—

Ex. 151.

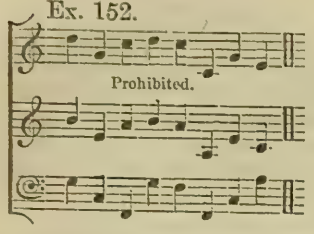


[In thorough-bass, a 3rd is always understood and to be performed when a 4th or a 2nd is not expressed;—thus, 6 stands for $\frac{6}{3}$; $\frac{6}{5}$, when followed by $\frac{6}{4}$, however, must not have a 3.]

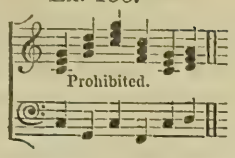
§ By *parts* is meant the several melodies which, when combined, constitute harmony: thus we speak of the violin, oboe, tenor, or other parts in a score, and of the treble, bass, upper, lower, or inner parts in music for keyed instruments. Students are recommended to write their tasks as much as possible in score, as the motion of the parts in music, adapted for keyed instruments, is not always easy to be discerned.

Between the treble and bass,—

Ex. 152.



Ex. 153.

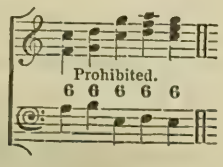


Between the treble and inner parts,—

Ex. 154.

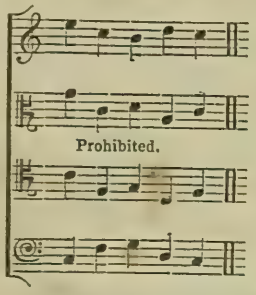


Ex. 155.

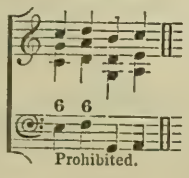


Between one inner part and another,—

Ex. 156.

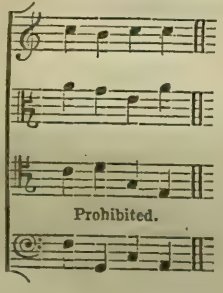


Ex. 157.

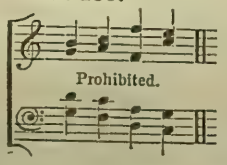


Between the inner parts and the bass,—

Ex. 158.



Ex. 159.

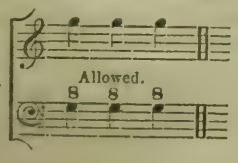


Rule 2nd.* Two† consecutive octaves, or unisons, must not take place between the same parts.

* This rule is the next in point of strictness to the foregoing. The violations of it by contrary motion occur more frequently than those of the former rule, as in Examples 165 and 166, and may be allowed on pressing occasions, as in canons, fugues, &c., where the subject could not otherwise be preserved. This manner of evading the rule is generally allowed in music of more than four parts, though it should never take place between the upper and lower parts, but generally between the bass and one of the inner parts. The student is, however, recommended to keep the rule as strictly as possible.

† A repetition of the same notes in octaves is not against rule, as,—

Ex. 160.



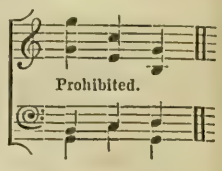
Thus, for instance, in a succession of any two chords, the part which is octave to any other part in the one chord, must not be octave to the same part in the next chord. The following are examples of violations of this rule :—

Between the treble and bass,—

Ex. 165.



Ex. 166.

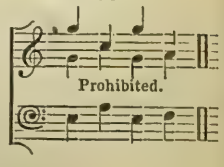


Between the treble and inner part,—

Ex. 167.

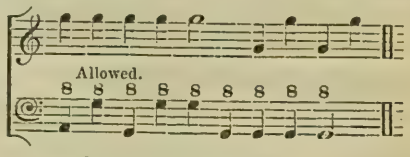


Ex. 168.



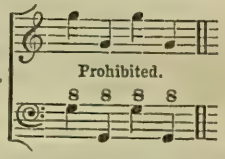
If one part moves while the other stands still, the rule is not broken :—

Ex. 161.



But it is contrary to rule for both parts to move,—

Ex. 162.



unless, indeed, the entire passage consists of octaves, and then a whole orchestra may perform in octaves to each other, and not break the rule, as,—

Ex. 163.

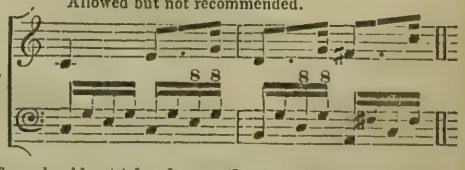


and the word tasto, or tasto solo, expresses this absence of chords in the thorough bass.

In modern music also, where the accompaniment consists of a number of essential notes (see Melody) in the way called arpeggio, octaves are allowable; but are not productive of any good effect, and should therefore be avoided.

Allowed but not recommended.

Ex. 164.

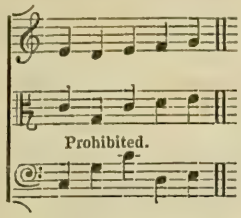


5ths and 8ves should not take place on the strongly accented or principal notes of the bar, though other notes may intervene.

5ths and 8ves must not take place between two notes not struck together followed by two which are. The author has not directed his pupils to avoid what are called hidden 5ths and 8ves, as he finds no composers observe these rules since the period of writing plain counterpoint in only two parts.

Between the inner part and bass,—

Ex. 169.

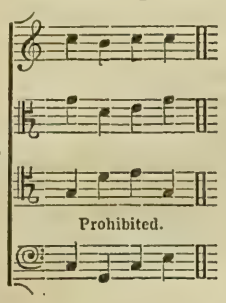


Ex. 170.

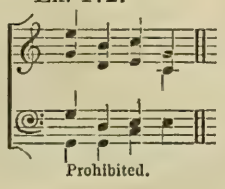


Between the inner parts,—

Ex. 171.



Ex. 172.



Method of accompanying the Triads in Thorough Bass.

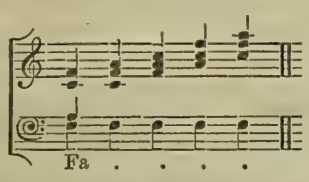
In thorough bass it is usual to accompany each bass note in a succession of triads, with three notes in the right hand, the third, the fifth, and the eighth; the last of which is added for the sake of enriching the harmony. The position of these notes, and their distance from the bass note (especially from the first bass note) being arbitrary. Thus the triad of C may be accompanied in the right hand by the notes C, E, and G, at any distance from the bass note; as,—

Ex. 173.



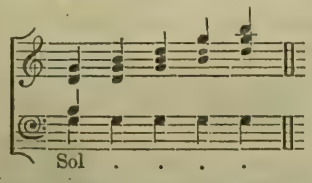
and the triad of F may be accompanied by F, A, and C, as,—

Ex. 174.



and the triad of G, by G, B, and D, as,—

Ex. 175.

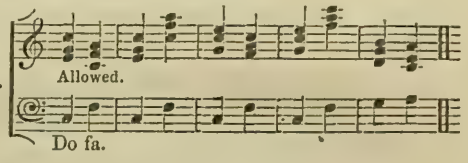


but in the first chord of each of these examples the hands are too near each other; and, in the last, too far apart, for general purposes.

In accompanying a succession of triads, the only rules which need be strictly observed are the two already given. But as there are various methods (some of which are more agreeable than others) of accompanying each succession, without the violation of the above rules, the following subordinate rules are offered to the student, to assist him in his choice.

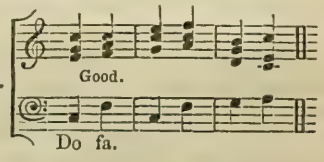
First Subord. Rule. To make the upper part stand still, if possible; or, if not, to make it move by the smallest interval. Thus the accompaniments used in the subjoined example,—

Ex. 176.



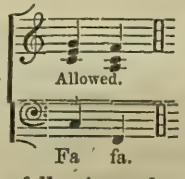
though not against the rules of harmony, are far less agreeable than those next following:—

Ex. 177.



Second Subord. Rule. When the upper part cannot stand still, to make it move in a contrary direction to the bass, when that moves by the interval of a fifth, third, and second. Thus the accompaniment in the former of the next two examples, is not so agreeable as that in the latter:—

Ex. 178.



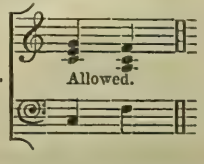
Ex. 179.



hence the following rule.*

Third Subord. Rule. When the upper melody cannot stand still, to make it move in a similar direction to the bass, when that moves by the interval of a fourth, sixth, and seventh. Thus the accompaniment in this example,—

Ex. 180.



is not so agreeable as that thus arranged:—

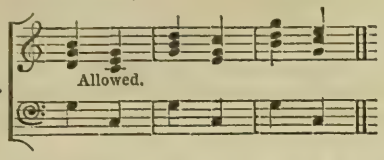
Ex. 181.



* This rule only relates to triads not inverted; see inversions of the triad. Some authors have extended the rule of contrary motion improperly to all motions of the bass, to avoid hidden 5ths and 8ves, concerning which the author gives no rules, considering them as obsolete.

Fourth Subord. Rule. When the leading note is contained in one triad, and the key-note in the next, to have these two notes in the same part. Thus the accompaniments here,—

Ex. 182.



are less agreeable than those in the following example :—

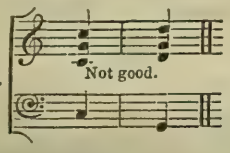
Ex. 183.



Fifth Subord. Rule. In choosing the position of the first chord of the right hand at the commencement of a succession, regard must be had to the motion of the bass, so that the hands may not presently become too near, or too far apart. Thus in the first simple diatonic succession, as the bass falls fifths or rises fourths, the accompaniment will rise, consequently the hands should be near each other at its commencement, and so also in the third and fifth simple diatonic successions. But in the second, fourth, and sixth simple diatonic successions, as the accompaniment will necessarily fall in contrary motion to the bass, the hands should not be near each other at the commencement.

Sixth Subord. Rule. Not to omit the third note of the triad, as here,*—

Ex. 184.



Seventh Subord. Rule. Not to double the third note of the triad, as here,—

Ex. 185.



The latter rules are of less importance than the former.

The pupil should now, by way of exercise, transpose the bass notes of the successions of the triads into other keys, and play the accompaniment without its being written down.

Inversions of the Triad.

When the fundamental note of the triad† is in the bass, or lowest part, the harmony is direct; but when any other note is in the bass, the harmony is inverted.

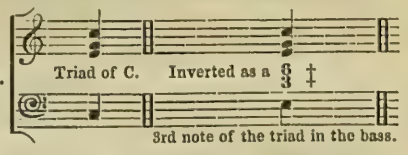
* In the last chord of a movement, ending in the minor key, the third was sometimes omitted by Handel and his cotemporaries.

† See note ‡, page 15.

There are two inversions of the triad :

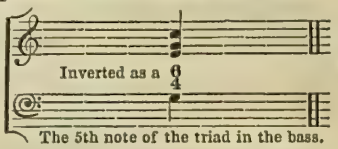
1st. When the third note of the triad is in the bass, accompanied with a third and sixth :—

Ex. 186.

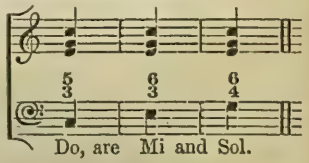


2nd. When the fifth note of the triad is in the bass, accompanied with a fourth and sixth.

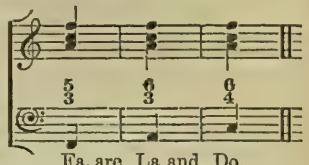
Ex. 187.



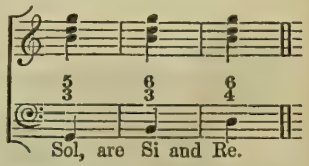
Thus, the inversions of



those of . . . . .

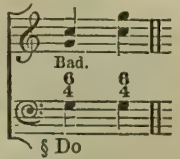


and those of . . . .



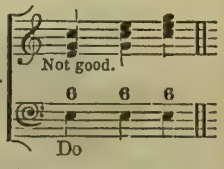
In accompanying these (whether in writing music, or in playing thorough bass) the sixth and seventh subordinate rules should be generally adopted. Thus, the third note of the triad should not be omitted,—

Ex. 188.



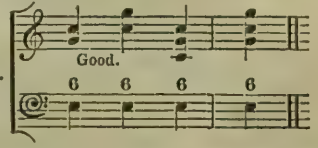
nor doubled,—

Ex. 189.



If two notes are sufficient, the sixth and the third will be the best, but if more than two are wanted in the accompaniment, some other note may be doubled, as in this example :—

Ex. 190.



‡ 6/3 is usually written 6, a 3 being understood where neither 4 nor 2 is put. See note ‡ on page 19.

§ The syllables Do, Fa, and Sol, are (in this work) written under inversions as well as direct harmony, and are intended to shew, not the name of the bass note, but of the fundamental note or root of the chord.

remembering always, however, that subordinate rules must give way to the two principal rules of avoiding perfect fifths and octaves.

The student, when composing music, may use either of these inversions in the middle of a passage,* for the sake of varying the bass. Thus the chords in this passage :—

Ex. 191.



may be varied, as follows :—

Ex. 192. or: Ex. 193.



The sixth and third may also be occasionally used on the first note of a passage, as,—

Ex. 194.



But a passage must never begin with the sixth and fourth. A passage should seldom terminate with the sixth and third, and never with the sixth and fourth.

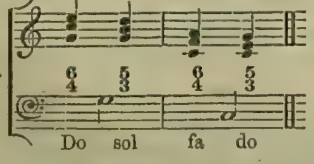
The sixth and fourth should be used very sparingly; and perhaps only in the two following ways : either when the triad from which it is derived is used before or after it, as in the following example :—

Ex. 195.



or when it is followed by a fifth and third on the same bass note, especially on a pedale, as,—

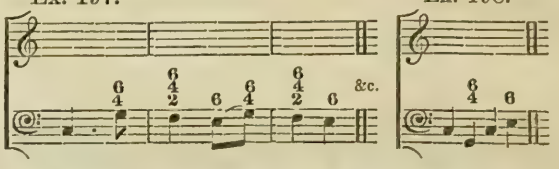
Ex. 196.



* A passage in music is equivalent to a sentence in grammar; as the latter signifies an assemblage of words forming a complete sense, and consequently terminated by some sort of period, so the former means an assemblage of notes, which may be played by themselves, and are terminated by some sort of cadence. See page 25 The word is, however, often applied improperly to a combination of passages containing many cadences, but distinguishable from the rest of the piece by some peculiarity of rhythm, modulation, or expression, as when we speak of a quick passage, a loud passage, a chromatic passage, &c.

The sixth and fourth is indeed sometimes used on unaccented notes, thus :—

Ex. 197. Ex. 198.



The sixth and fourth on the 2nd note of the key in the bass (or the triad of Sol inverted as a $\frac{6}{4}$) is avoided by all good composers.

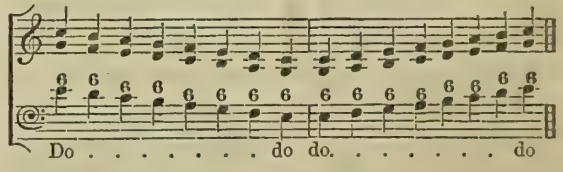
The student should be careful to use these inversions in such a manner only as can be supported by the authority of the best masters.

The chords of the sixth and third, and sixth and fourth, are not always inversions of a triad.

Thus the sixth and third on Fa is not an inversion of any triad, but is derived from the discord of a sixth, fifth, and third on Fa (see added Sixth). The sixth and third on Re is derived from the discord of a seventh, fifth, and third on Sol (see Dominant Seventh).

In the species of faburden,† called in this work a Succession of Sixes, the bass may ascend or descend throughout the octave, in the major key, every note being accompanied with a sixth and third, thus :—

Ex. 200.

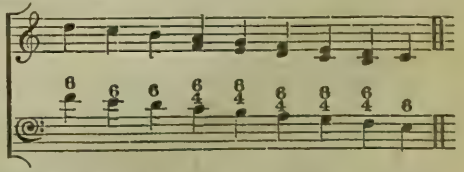


Such a succession is not‡ considered as an inversion of triads.

In accompanying this succession, it will be found most convenient (in order to avoid consecutive perfect fifths and octaves) to have the sixth note in the upper melody, as in the preceding example.

† The succession of sixes and the pedale or drone bass (see discords of suspension and transition) are the only remains of a species of harmony called by the Italians, Falso Bordone, by the French, Faux Bourdon, and by the English, Faburden; in which each bass note had the same accompaniment, or in which every treble note was accompanied by the same bass note, like the drone of the bagpipe, and the bass of all pastorale movements. Haydn is, perhaps, the only one who has used the sixth and fourth on more than two bass notes, and that only in the following passage; the author of this Treatise considers it as an inversion of the succession of sixes :—

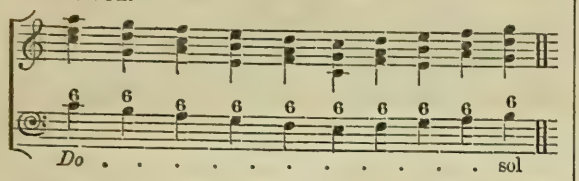
Ex. 199.



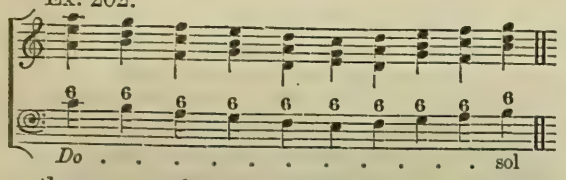
‡ If a succession of sixes were considered as an inversion of triads, then it would be allowable for a bass to ascend and descend through the octave, each note being fundamental (*viz.*, accompanied with a fifth and third), and including the dissonant triad; which is not the case. The first and last notes may, however, be considered as inversions, and marked as such, as in the above example, where the first and last notes are called Do.

When more than two notes are required in the accompaniment, it will be necessary (in order to avoid consecutive perfect fifths and octaves) to double the third note of the triad in every alternate chord, as in the two following examples :—

Ex. 201.

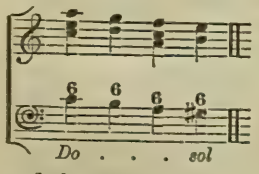


Ex. 202.



or the accompaniment may consist of two and three notes alternately, thus :—

Ex. 203.

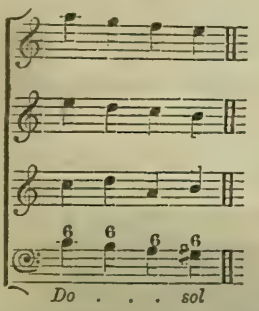


Ex. 204.

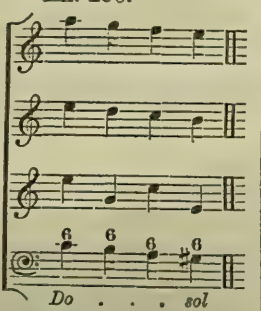


and these may be written in parts, thus :—

Ex. 205.

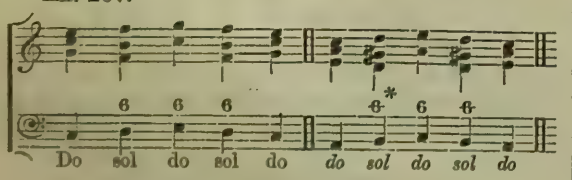


Ex. 206.



When only the sixth and third on Re and Mi are used together (derived from Sol and Do, see Dominant Seventh), the third, instead of the sixth, may be in the upper melody, as in Examples 150 and 151; for the consecutive fifths in the accompaniment are not against rule, one of them being imperfect. When more than two notes are required in the accompaniment, they may be used as in the following examples, and these, when written in parts, may be thus arranged :—

Ex. 207.



* 6 stands for ♯6. 4, for ♯4, &c.

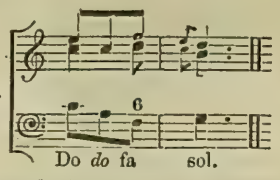
Ex. 208.



It will be seen from the foregoing examples, that detached parts of the succession of sixes are oftener found than the whole passage; and that when the passage concludes with *Sol* in the minor key, the third note of the triad is made sharp. See Cadences.

The sixth and fourth on Sol, when accented† and succeeded immediately by the fifth and third on the same note, is not, as it appears to be, the triad of Do inverted, but merely a double appoggiatura on the triad of Sol, and both chords are consequently considered as Sol; sometimes this chord is written in small notes, thus :—

Ex. 209.

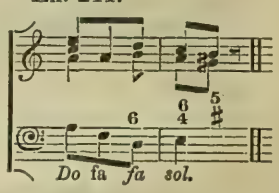


but more frequently in uniform characters, as in the following examples :—

Ex. 210.

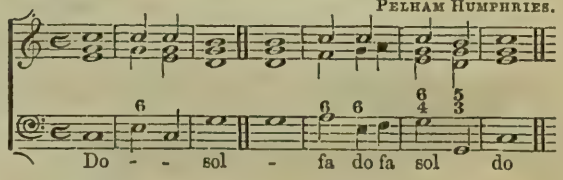


Ex. 211.

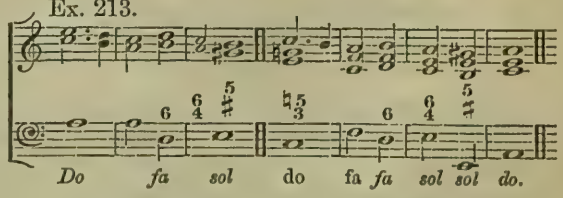


Ex. 212. The Grand Chant.

PELHAM HUMPHRIES.



Ex. 213.



The sixth and fourth on La (if ever used) is not an inversion of a triad, but is derived from the sixth and third on Fa. See added Sixth.

† See note †, next page.

The sixth and fourth on Fa is not an inversion of a consonant triad, but is derived from a seventh, fifth, and third on Sol (see Dominant Seventh); and, as such, sometimes succeeds the sixth and fourth on Sol; and both are then derived from Sol.

Ex. 214.



Of Closes or Cadences.

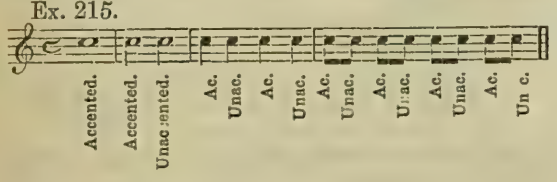
A Close, or Cadence, is the termination, or last chord, of a passage,* which ought always to be an accented note.†

* The length of a passage is known by its close (p. 23, note *), and here a close is known by its being the end of a passage. In fact, there is often some difficulty in shewing which is the termination of a passage. In chants, the last chord of each part (*viz.*, the note preceding each double bar) is the note of the cadence; or, in other words, the length of each passage is shewn by the double bars. See Examples 212, 213.

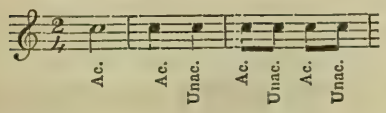
In psalm tunes, by double bars; or, which is generally the same thing, by the length of the lines in the poetry. In recitative, by the length of the sentences. In instrumental music, it is generally at the end of every two or four bars. The last note of one passage is frequently the first note of the next.

† Of equal notes in common time, the first, third, fifth, and seventh are accented; the second, fourth, sixth, and eighth are unaccented. In triple time and triplets, the first of every three equal notes is accented; and the second and third unaccented. See the following examples:—

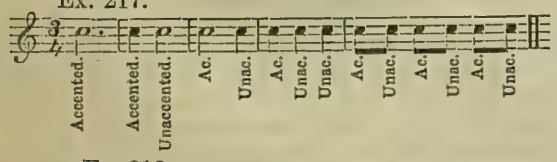
Ex. 215.



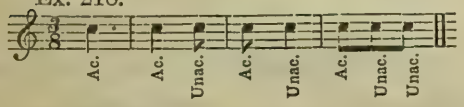
Ex. 216.



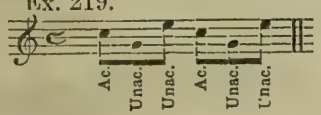
Ex. 217.



Ex. 218.



Ex. 219.

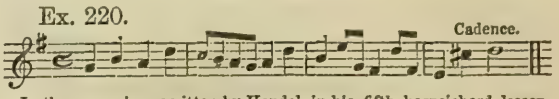


But in common time, the most accented notes (and on one of which the cadence should fall) are those which begin the bar, and the second half of the bar: or, in other words, a close should always fall on the beginning, or the middle of the bar: the first of these is preferable, though many instances might be adduced, from high authorities, of cadences falling on other notes; and even of the same cadence, in the same composition, falling on different parts of the bar. The following example is part of an air by Wagenseil, in which the close falls on the middle of the bar:—

There are four kinds of Cadence.

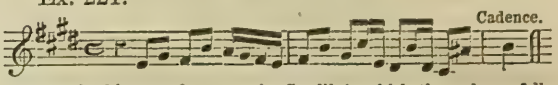
1st. When a passage ends with the triad of Do, that termination is called a full close, or perfect cadence, and is generally preceded by the triad of Sol,

Ex. 220.



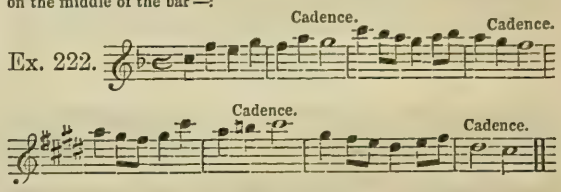
In the same air as written by Handel in his fifth harpsichord lesson, the cadence falls on the first note of the bar:—

Ex. 221.



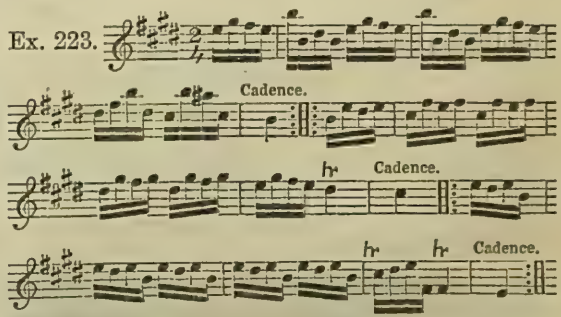
The subjoined is part of a gavot, by Corelli, in which the cadence falls on the middle of the bar —:

Ex. 222.



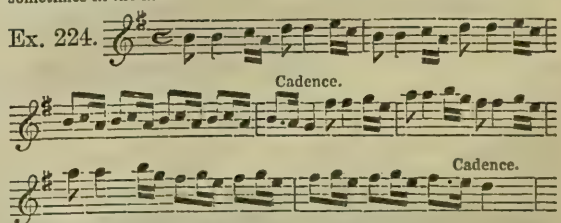
In the following gavot, by the same master, he has placed all the cadences on the first note of the bar:—

Ex. 223.



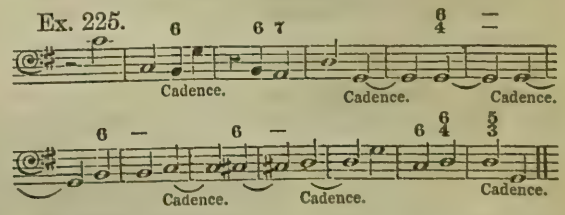
The subjoined passage is a part of the celebrated Gloria in excelsis, by Pergolesi, in which the cadences are sometimes in the beginning and sometimes in the middle of the bar:—

Ex. 224.



And the next example, from the same composition is an instance of a succession of cadences all falling on the middle of the bar, and which would certainly agree better with the established manner of beating time, were they placed at the beginning of each bar; in which case, the hand or foot, instead of being lifted at the conclusion of the passage, would fall when the last chord is struck.

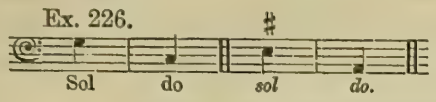
Ex. 225.



[These marks (—) and (=), placed over the bass, signify that the same chord is to be continued in the accompaniment.]

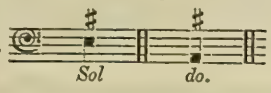
viz., Sol Do in the major key, and *Sol Do* in the minor key, thus :—

Ex. 226.



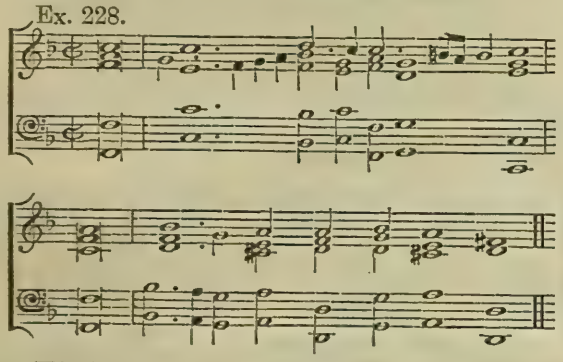
In all Cadences the triad of *Sol* in the minor key is to be a major triad. Sometimes also the triad of *Do* in the minor key is made a major triad after *Sol*,* as,

Ex. 227.



This will be found to be the case in the following chant, by Josquin de Prez—a composition of the 15th century, which is remarkable for the clearness of its harmony, the smoothness of its melody, and the simplicity and richness of its modulation :—

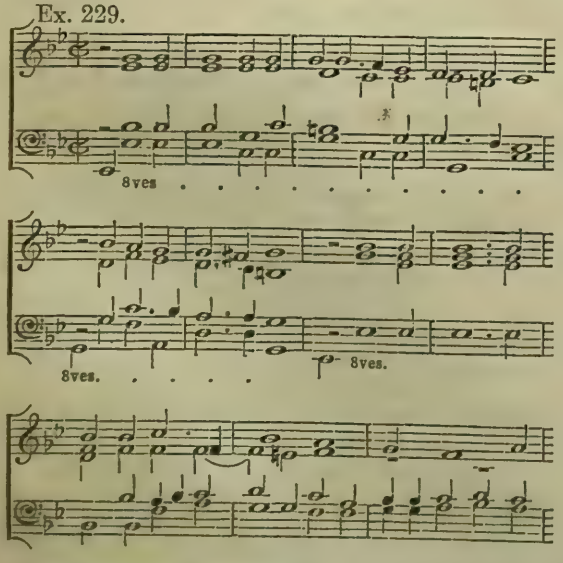
Ex. 228.



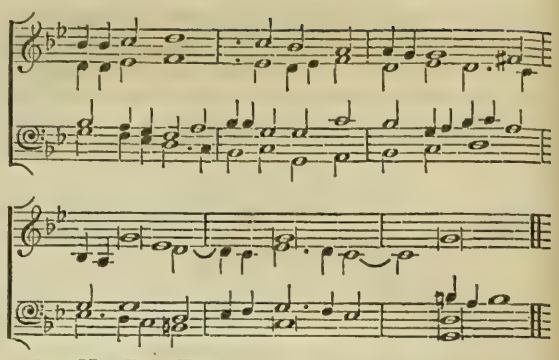
This chant is given in score by Burney, in his History of Music, vol. 2, page 464.

And another example of this occurs in the 6th bar of the Gloria Patri to the Nunc Dimittis of Richard Farrant :—

Ex. 229.



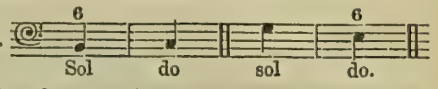
* This major triad of *Do*, in the minor key, was called the Tierce de Picardie, from having been invented, or much used, in that province.



See Novello's Edition of Boyce's Cathedral Music, vol. 1, page 84, where this movement will be found in vocal score, with organ accompaniment.

The sixth and third is sometimes used as an inversion of either Sol or Do in a full close, but very seldom however, and never at the conclusion of a movement.

Ex. 230.



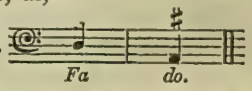
The fourth subordinate rule must be observed in this Cadence ; *viz.*, the leading note should be succeeded by the key note in the same part. The full close on Do may likewise be preceded by the dominant seventh ; see Dominant Seventh : or it may be preceded by the triad of Fa, *viz.*, Fa Do in the major key, and *Fa Do* in the minor key.

Ex. 231.



Do in the minor key is generally made a major triad after *Fa*, as,—

Ex. 232.

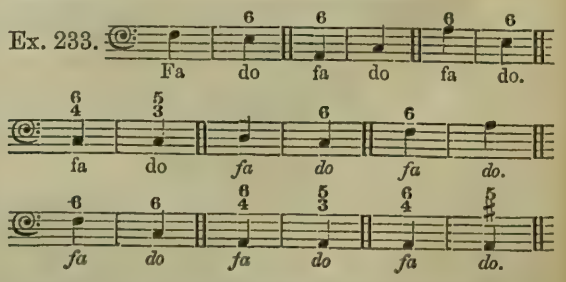


This is the case in the last bar of the Gloria Patri by Farrant.

The sixth and third is sometimes, though rarely, used as an inversion in this cadence ; and never at the conclusion of a movement.

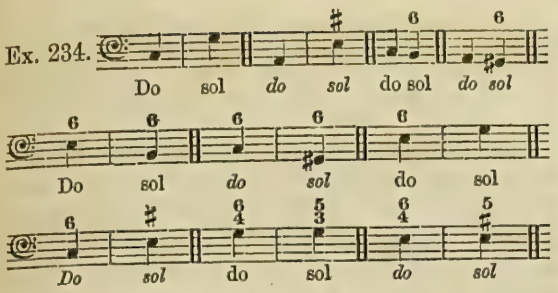
The sixth and fourth on Do may be occasionally used as an inversion of Fa before Do, at a full close in church music, both in the major and minor keys, particularly at the end of a movement.

Ex. 233.



2nd. When a passage ends with the triad of Sol, that termination is called a half close, or imperfect cadence, and may be preceded by Do, *viz.*, Do Sol in the major key, and *Do Sol* in the minor key.

Ex. 234.

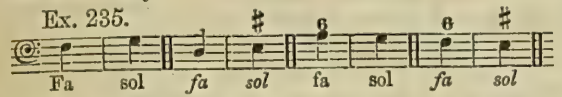


The sixth and third is sometimes used in this cadence.

The sixth and fourth is sometimes used as an inversion of Do before Sol in this cadence, but never as an inversion of Sol.

The triad of Sol may likewise be preceded by that of Fa; *viz.*, Fa Sol in the major key, and *Fa Sol* in the minor key.

Ex. 235.

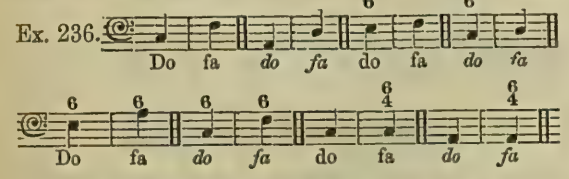


The sixth and third is sometimes used in this cadence as an inversion of Fa before Sol, but not of Sol; nor is a sixth and fourth used.

The half close never concludes a movement, unless another movement immediately succeeds.

3rd. When a passage ends with the triad of Fa, that termination is called a deceptive close, or deceptive cadence, and may be preceded by Do; *viz.*, Do Fa in the major key, and *Do Fa* in the minor key.

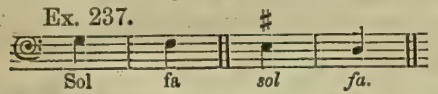
Ex. 236.



The sixth and third, and sixth and fourth, may be used in this cadence, as in the example.

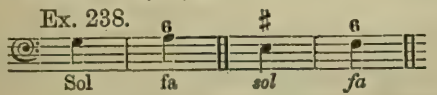
The triad of Fa may be preceded by that of Sol,—

Ex. 237.



but in this case the chord of Fa is generally inverted as a sixth and third, as,—

Ex. 238.

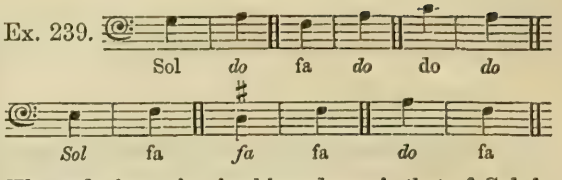


No other inversions are used in this cadence.

A movement never concludes with the deceptive close.

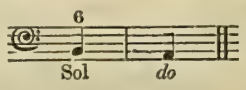
4th. When a passage concludes with *Do* in the minor key, preceded by either of the triads of the major key (generally Sol), or concludes with Fa in the major key, preceded by either of the triads of the minor key (generally *Sol*), that termination is called, in this work, a close delayed; in other works, a false, flying, or abrupt cadence:—

Ex. 239.



The only inversion in this cadence is that of Sol in the major key:—

Ex. 240.



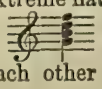
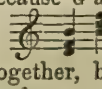
A movement never concludes with the close delayed.

The full close is the most frequently used; next to that, the half close. The deceptive close and close delayed rarely occur. Other terminations of passages may be met with in modern music, but they may be considered as licences till they become more generally adopted; such as passages ending with discords, which can hardly be considered as regular cadences, nor can they easily be reduced to rule, as they are generally intended to produce surprise by their novelty.

CHAPTER III.

Of Discords.

A discord is any combination of notes differing from a Concord (see page 13), and may consequently be known either by there being two notes next to each other, as to their alphabetical order, or some extreme flat or sharp interval.

 is a discord, because G and F are next to each other in the scale.  is a discord, though no two notes are together, because B and F form an extreme sharp fourth, or extreme flat fifth.  is a discord, because F and D♯ form an extreme sharp interval.*

When two notes, standing next to each other in alphabetical order, are struck together, the lowest of the two, according to that order, is called the discordant note. Thus in the following example, in each of the chords, F is the discordant note; though it is sometimes in the upper part and sometimes in the lower part of the chord, sometimes over and sometimes under G; but it is the lowest when F and G are next to each other:—

Ex. 241.



And here D is the discordant note in each of the

* When there is an imperfect interval, but no two notes next to each other in alphabetical order, some note is generally understood which would be next to another, if inserted.

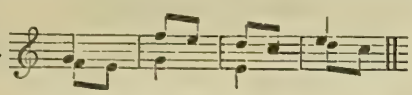
Thus in the major key $\overset{F}{D}$ are part of the discord of $\overset{F}{\underset{B}{D}}$; and in the minor key $\overset{F}{D}$ is part of the discord $\overset{B}{\underset{F}{A}}$ in which there are notes next to each other in alphabetical order. $\overset{B}{\underset{D}{\ }}$

chords, because undermost, when D and E are struck together next to each other in the scale. :—

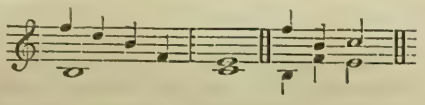
Ex. 242. 

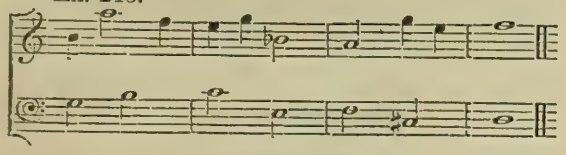
The discordant note should not be doubled or put in two of the parts.

A discord is resolved by the discordant note falling to the next note below, in the following chord or discord.

Ex. 243. 

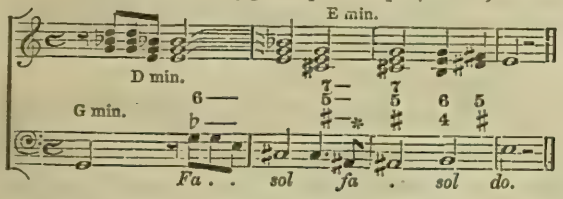
But before a discord is resolved, some of its notes may change places.

Ex. 244. 

Ex. 245. 

Ex. 246.

The last 4 bars of "My genial spirits droop." *(Samson.)*



Discords may be diatonic or chromatic.

By diatonic discords is meant, in this work, such as belong to the major key, including such chromatic discords as are mere transpositions of the same, from the major to the minor key, which is generally chromatic in modern music.

Diatonic discords are of four kinds; discords of addition, of suspension, of transition, and of syncopation.

I. *Discords of Addition.*

Discords of addition are so called because the note which occasions the discord may be added to the triad from which it is derived, when the composer pleases. They may be either on the accented or unaccented parts of the bar.

There are three discords of addition.

1st. The added seventh, discord of Sol, or dominant seventh.

2nd. The added sixth, great sixth, discord of Fa, or sub-dominant sixth.

3rd. The added ninth, or double discord of Sol, together with the leading seventh, which is derived from it.

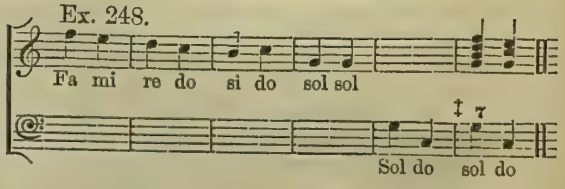
* Here A♯ is used instead of B♭.

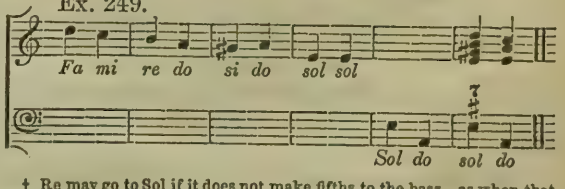
1st. *The added seventh, discord of Sol, or dominant seventh,* is a seventh, added to the triad of Sol (the dominant), or is a seventh, fifth, and third upon Sol, the third being major, whether in the major or minor key.

In resolving this discord, the seventh is the discordant note, and must therefore fall to the note below in the next chord or discord. Thus, for instance, in the major key of C, the dominant seventh is  , and the discordant note F must fall to E; but the only chord in the key of C which contains an E is the triad of Do,  . Therefore the usual resolution of the dominant seventh is into the triad of Do. And the rules to be observed are:

1st. The discordant note must fall: *viz.*, Fa to Mi.
2nd. The leading note must rise, that it may go to the nearest note . . Si to Do.
3rd. Re may go to Do, that it may avoid consecutive fifths to the bass, and avoid doubling the third . . . Re to Do.†
4th. Sol, if in the bass, should either fall to Do, or stand still; if it went to Mi it would double the third. When in the accompaniment, Sol should remain still . . . . . Sol Do. or Sol Sol.

Ex. 247. 

Ex. 248. 

Ex. 249. 

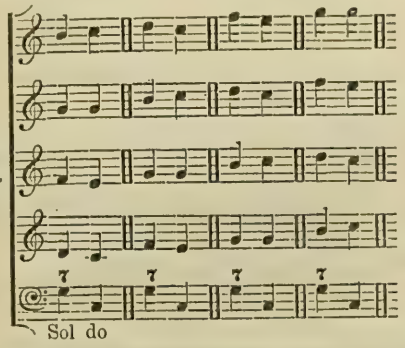
† Re may go to Sol if it does not make fifths to the bass—as when that is Sol Sol; but that never takes place in a cadence or conclusion of a movement: Re may also go to Sol in the accompaniment when Fa Mi is the bass.

‡ 7 stands for $\frac{7}{9}$, excepting when followed by a 6 on the same bass note, and then 7 6 stands for $\frac{7}{3}\ \frac{6}{5}$.

$\frac{7}{5}$ stands for $\frac{7}{5}_{3}$, but the unexperienced performer in thorough bass had better not supply it when omitted in the thorough bass.

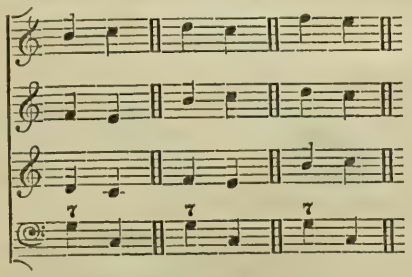
The next example shows the various resolutions of the dominant seventh, according to the above rules in a score of five parts, the fundamental note of the dominant seventh being doubled; or, in other words, the discord consisting of an eighth, seventh, fifth, and third :—

Ex. 250.



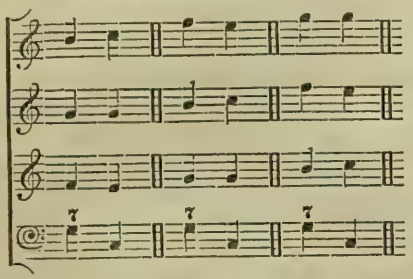
The following example is the resolution of the same discord in four parts, without the eighth, which occasions the omission of the fifth in the triad of Do:

Ex. 251.



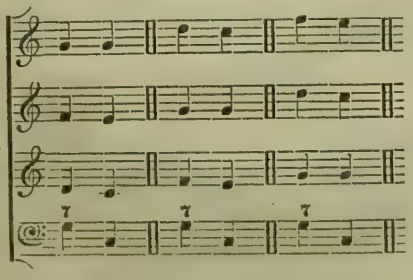
The next example shows another method in four parts, the discord consisting of an eighth, seventh, and third; the fifth being omitted :—

Ex. 252.



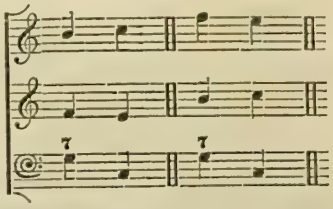
Another method in four parts is subjoined, the discord consisting of an eighth, seventh, and fifth; the third being omitted. This method may be used for the sake of variety, but is not so agreeable as the former. See Sixth Subord. Rule, page 22 :—

Ex. 253.



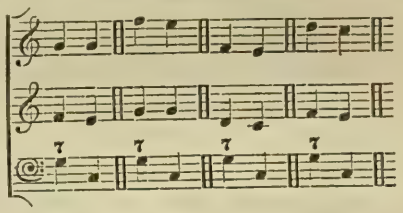
The next example shows the resolution, in three parts, the discord being the seventh and third; the fifth omitted :—

Ex. 254.



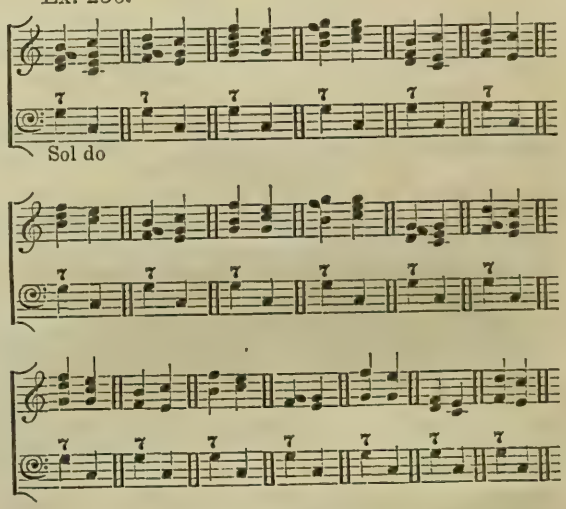
The succeeding example contains other methods less agreeable. See Sixth Subord. Rule, page 22 :—

Ex. 255.



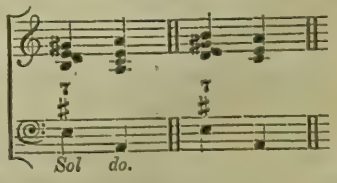
All the foregoing methods, written in thorough bass for a keyed instrument, are contained in the next example :—

Ex. 256.



Part of the foregoing methods transposed into the relative minor key are subjoined, from the study of which it will be easy to transpose all the rest into the same key (which is here recommended to the student as an exercise), as also into several other major and minor keys :—

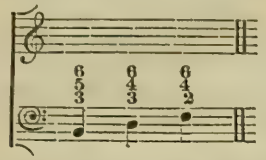
Ex. 257.



In all the above methods, the bass note, Sol, instead of falling a fifth to Do, may occasionally remain on Sol, and have a sixth and fourth.

The inversions of the dominant seventh, are the sixth, fifth, and third on Si; sixth, fourth, and third on Re; and sixth, fourth, and second on Fa:—

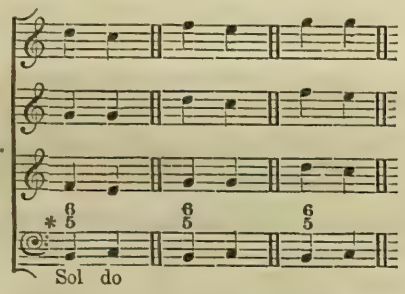
Ex. 258.



These are all resolved according to the foregoing rules, page 28.

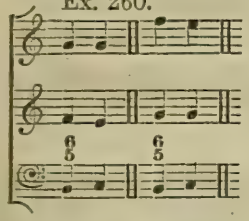
For the resolution of the sixth, fifth, and third on Si, in four parts, see the following example:—

Ex. 259.

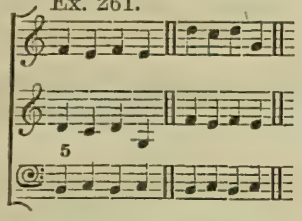


The same, in three parts, is thus effected:—

Ex. 260.



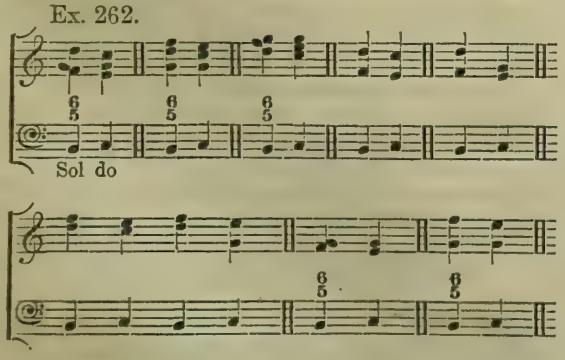
Ex. 261.



In the latter example, the fundamental note, Sol, is omitted, and the discord becomes the dissonant triad; the inversions of which will occur hereafter. In accompanying the dissonant triad, it is best not to double the bass, or, in other words, to have no eighth.

A repetition of the same example, written for keyed instruments, is subjoined:—

Ex. 262.



The following example is in the relative minor key, into which the student should transpose the whole, as well as into other keys:—

* $\frac{6}{5}$ stands for $\frac{6}{5.}{}_{3}$

Ex. 263.



The resolutions of the sixth, fourth, and third on Re, are, in this work, only written for keyed instruments; and the student may write them in score, as well as transpose them.

The fundamental note, Sol, as inserted in the following passages, is peculiar to modern music:—

Ex. 264.



Handel, Corelli, and other composers of the same period with them, avoided fourths to the bass note as much as possible, and wrote this discord as an inversion of the dissonant triad, thus:—

Ex. 265.



This discord is frequently used as part of the succession of sixes, thus:—

Ex. 266.

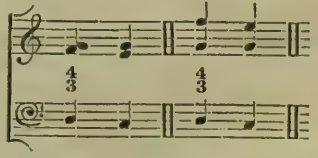


If the third or discordant note is doubled, the upper one falls and the lower rises, as,—



For the sake of variety, the sixth note from the bass (*viz.*, the third note from the fundamental note, Sol) is omitted; contrary to the Sixth Subordinate Rule, page 22, thus:—

Ex. 267.



The next example shows this inversion in the minor key of A:—

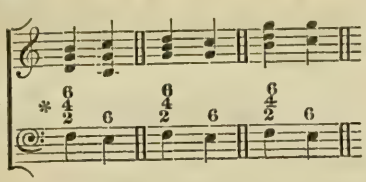
Ex. 268



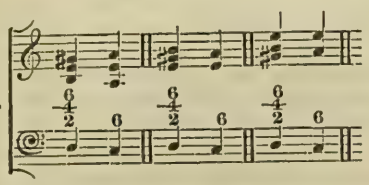
† 6 stands for a sharp 6th, 4 for a sharp 4th, &c.

The resolutions of the sixth, fourth, and second on Fa are here likewise only written for keyed instruments.

Ex. 269.

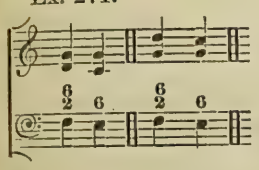


Ex. 270.



Either of the notes of the sixth, fourth, and second may be omitted in the accompaniment, thus :—

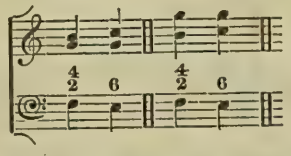
Ex. 271.



Ex. 272.



Ex. 273.

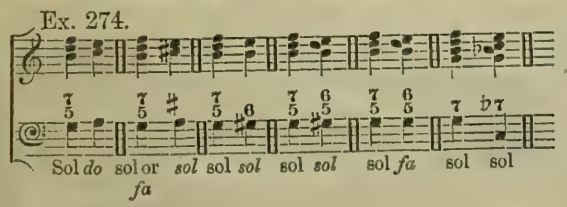


But the omission of the fourth (*viz.*, of the third note from the fundamental note) has a bad effect, being contrary to the Sixth Subordinate Rule, page 22.

The dominant seventh and its inversions are sometimes irregularly resolved into other chords, not in the same key, which contain a note to which the discordant note may fall.

Thus the dominant seventh $\overset{F}{\underset{G}{D}}_{B}$, may be resolved into any chord or discord which has an E to which the discordant note may fall, as,—

Ex. 274.



* $\frac{4}{2}$ often stands for $\frac{6}{4}$, and the 6th is, according to most writers, to be supplied by the performer of thorough-bass, only, however, when the bass note falls one note in its resolution—if it is succeeded by $\frac{5}{3}$, on the same bass note, $\frac{4}{2}$ must not have a sixth added. The unexperienced performer in thorough-bass is therefore recommended by the author of this work not to supply the sixth, where it is omitted in the thorough-bass.

Ex. 275.

And thus the dominant, seventh in the minor key $\overset{D}{\underset{E}{B}}_{G\sharp}$, may be irregularly resolved into $\overset{C}{\underset{F}{A}}$, as :—



Ex. 276.

but not into $\overset{C}{\underset{E}{G}}$, because the leading note, $G\sharp$, must never fall one semitone, in this way, after the dominant seventh, excepting in chromatic modulations, as,—



2nd. *The added sixth, great sixth, discord of Fa, or subdominant sixth,* is a sixth added to the triad of Fa, or is a sixth, fifth, and third upon Fa, which is the root; Do, the fifth, being the discordant note. It may be preceded by either of the triads, Do, Fa, or Sol, as,—

Ex. 277.



or by a seventh, fifth, and third on Fa, as,—

Ex. 278.



In resolving this discord, the discordant note must fall to the note below; page 28. Thus, for instance, in the major key of C, the added sixth is—



and the discordant note, C, must fall to B. But the only chord in the key of C which contains a B, is the triad of Sol,  , or the discords of the dominant seventh,  , added ninth,  , or leading seventh,  , derived from it.

When this discord is resolved into the triad of Sol, the following rules should be observed.

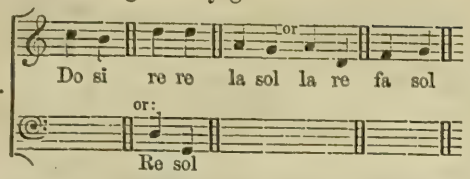
1st. The discordant note Do must fall to Si.

2ndly. Re may remain on Re, or (especially if in the bass) go to Sol. It must do so when accompanied by a $\frac{7}{5}$.

3rdly. La may go to Sol to avoid doubling the third, or to Re, if it avoid fifths; but this is only in the accompaniment, never in the bass.

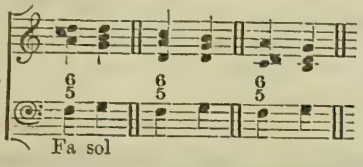
4thly. Fa should generally go to Sol.

Ex. 279.



The following example shows the resolution of this discord into the triad of Sol, in four parts, for keyed instruments :—

Ex. 280.



The next example contains the resolution of the discord in three parts, with the third omitted, which has a better effect in this discord than in most others.

Ex. 281.



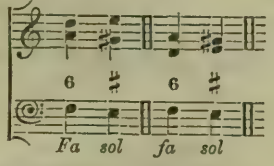
The discord in three parts, with the fifth omitted, is resolved thus :—

Ex. 282.



This chord in the major key of C, consisting of the same notes, $\overset{D}{A}$, with the inverted triad of *Fa* in the relative minor key of A, $\overset{F}{F}$, $\overset{A}{}$, is only distinguishable from that by being succeeded by another chord in the same key.* Thus the sixth and third on $\overset{D}{}$, in the last example, and the sixth and third on F here,—

Ex. 283.

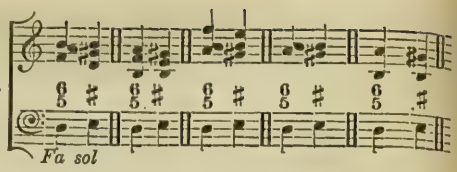


are alike, but those in the former passage are known to be the sixth, fifth, and third on Fa in the major key of C with the fifth omitted, by the succeeding chords of Sol in the same key; and those in the latter example are known to be inversions of *Fa* in the minor key of A, by the following chords of *Sol* in the same key.

The following are transpositions into the relative minor key of this discord in four parts; in three parts with the third omitted; and in three parts with the fifth omitted :—

* Fa with a $\frac{6}{3}$ may be succeeded by the triad of either Sol or Do.

Ex. 284.



Ex. 285.



But the transition from La to Si, *viz.*, from F to C♯ in the last of these (which was made that the third note of the triad of *Sol* with a major third might not be omitted; see Sixth Subord. Rule, page 22) has a bad effect, being three semitones. The next examples contain a better method.

Ex. 286.



Ex. 287.



The third of the discord of *Fa* in the minor key may be occasionally sharp, as,†—

Ex. 290.



Ex. 291.



The sixth and third on *Fa*, in the minor key, may be mistaken for the sixth and third, derived from the sixth, fourth, and third on Re in the major key, with the fourth omitted :—

Ex. 292.



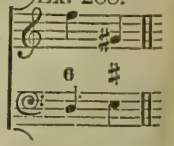
Ex. 293.



but may be distinguished from it by the succeeding chord being in the same key. Thus in the following passages, the first chords of each are a sixth and

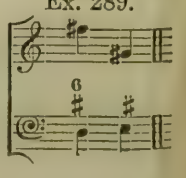
† Though *La* in the minor key seldom ascends to *Si*, the leading note in the minor key, because the interval is three semitones, as already mentioned; yet it often descends to the leading note below, as—

Ex. 288.



On the contrary, though *La*♯ (the major third to *Fa*) often ascends to the leading note, as in Ex. 290, yet it never descends, thus :—

Ex. 289.



third on D; the first is known to be in the major key of C, by the succeeding chord Do, and the other is known to be in the minor key of A, by the succeeding chord *Sol*:—

Ex. 294. 

Ex. 295. 

The $\frac{6}{3}$ on Fa, may also be followed by a $\frac{5}{4}$ or $\frac{6}{4}$ on Sol, whether in the major or minor key.

The inversions of the added sixth, are a sixth, fourth, and third on La—a sixth, fourth, and second on Do—and a seventh, fifth, and third on Re.

Ex. 296. 

The resolution of the sixth, fourth, and third, which is the least common inversion of the three, is thus effected :—

Ex. 297. 

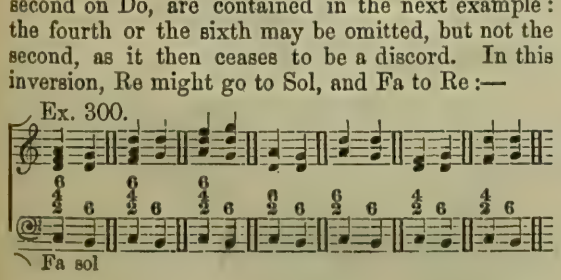
The third in this chord is never omitted (for the sixth and fourth is seldom used, excepting on Do, Fa, and Sol), and if the fourth is omitted it ceases to be a discord; the sixth, however, may be omitted.

Ex. 298. 

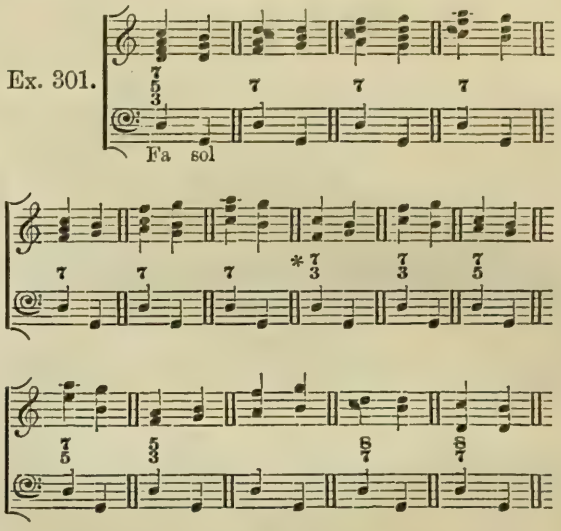
The next example shows the resolution of the sixth, fourth, and third in the minor key :—

Ex. 299. 

The various resolutions of the sixth, fourth, and second on Do, are contained in the next example: the fourth or the sixth may be omitted, but not the second, as it then ceases to be a discord. In this inversion, Re might go to Sol, and Fa to Re :—

Ex. 300. 

The next example exhibits the various resolutions of the seventh, fifth, and third on Re, with its occasional omissions of the fifth, the third, and the seventh :—

Ex. 301. 

The fifth and third on Re resembles the chord of *Fa* in the minor key, and is distinguished from it by the following chord. Thus in the subjoined examples, the triad of $\overset{A}{F}$ is alike in both, but the following chord in the former determines the key to be C major; and in the latter, the following chord determines the key to be A minor.

Ex. 302. 

Ex. 303. 

The next example shows the same discord in the minor key :—

Ex. 304. 

This may also be mistaken for the leading seventh in the key of C, and is distinguished in the same way, *viz.*, by the following chord. Thus the next passage is in the key of C major, though the first chord in it is identical with the first chord in the last example :—

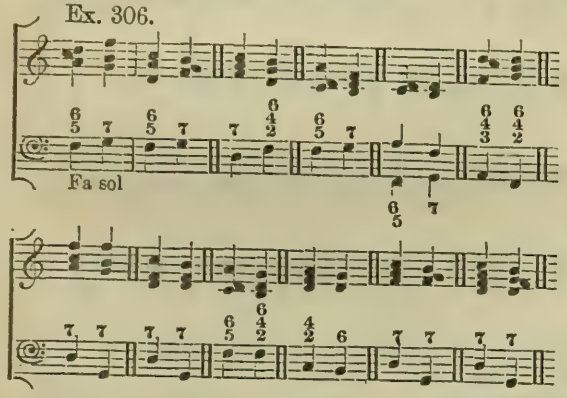
* When $\frac{7}{3}$ is put, it is wrong to substitute the 5; and when $\frac{7}{5}$ is put, it is wrong to substitute the 3. $\frac{9}{7}$ in general stands for $\frac{9}{5}$; but $\frac{9}{7}$ implies that there is no 5, and $\frac{9}{5}$ implies no 7, &c.

Ex. 305.



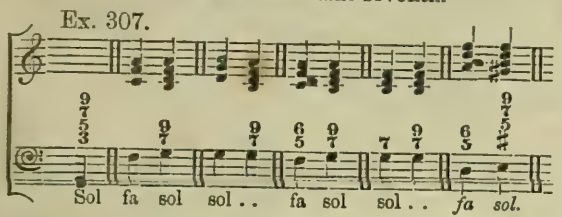
When the added sixth (or any of its inversions) is resolved into the dominant seventh, the discordant note Fa of the latter discord may succeed either Re, La, or Fa in the same part, but seldom, if ever, Do, because Do is the discordant note of the former discord, and must fall to the note below.

Ex. 306.



3rdly. *The added ninth, or double discord of Sol,* is a ninth added to the dominant seventh.*

Ex. 307.



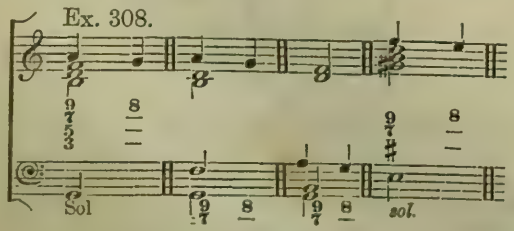
The third is always major, whether in the major or minor key.

The ninth is more frequently in the upper melody than either of the other notes.

La is the peculiar discordant note of this discord, and must fall to Sol. Fa, however (the seventh), is also a discordant note, and must fall to Mi, either at the same time, or immediately afterwards.

If La falls first, this discord is resolved into the dominant seventh :—

Ex. 308.



If La and Fa are resolved together, by both falling to the notes below at the same time, *viz.*, La to Sol, and Fa to Mi, this discord is resolved into the triad of Do, either as a fifth and third, or as a sixth and fourth, which is preferable; but not as a sixth and third.

Ex. 309.



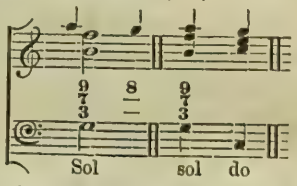
The third note of this discord is seldom omitted, as in the following example :—

Ex. 310.



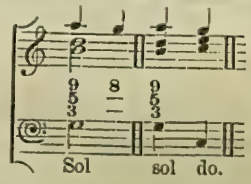
The fifth may be omitted, as,—

Ex. 311.



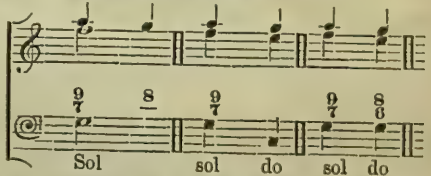
The seventh very seldom is omitted :—

Ex. 312.



The fifth and third may both be omitted :—

Ex. 313.

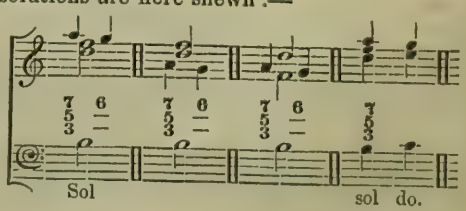


The ninth, seventh, fifth, and third, when it has no omission, must not be inverted.

But the most usual and beautiful omission in this discord is that of the fundamental note, Sol. This discord then becomes a seventh, fifth, and third on Si, the leading note of the key; and hence it is called, in this work, the leading seventh. In the minor key it is sometimes called the diminished seventh, all its intervals being minor.

Its resolutions are here shewn :—

Ex. 314.



* This discord is of modern invention, and not proper for church music.



its omissions may be seen in the next example:—

Ex. 315.



It is sometimes inverted as a sixth, fourth, and third on Fa. The third (which had been the ninth) being at the top:—

Ex. 316.



The sixth of this latter discord may be omitted, but not the fourth:—

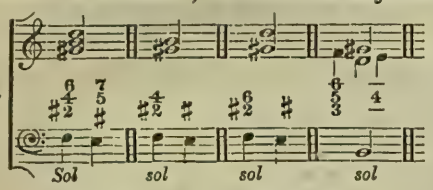
Ex. 317.



The $\frac{6}{5}$ on Re, the second note of the key, may also be used with the fifth at the top: in its use the bass must ascend to Mi with a sixth.

Other inversions of this discord may be met with in modern music in the minor, but not in the major key:

Ex. 318.

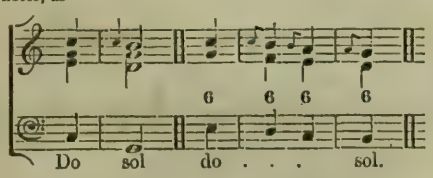


II. *Discords of Suspension.*

Discords of suspension are so called because the discordant note must be suspended from a note, in the same part of the preceding chord or discord; and they are always accented.*

* They are also called prepared discords, preparation signifying this existence of the discordant note in the preceding chord. Being accented notes they resemble appoggiaturas, and some authors have therefore called them suspended appoggiaturas; for they are sometimes written as ornamental notes, as—

Ex. 319.



The principal discords of suspension are:—

1st. The $\frac{5}{4}$.

2nd. The $\frac{9}{5}$.

3rd. The $\frac{7}{3}$.

4th. The $\frac{7}{5}$ on Fa.

5th. Discords of addition prepared.

6th. Discords of suspension on a pedale—and

7th. Double discords.

1st. *The discord of a fifth and fourth* is generally used on Sol, and frequently on Do; but seldom, if ever, on Fa in the major key, because the fourth is extreme sharp.† It may be used on either *Do*, *Fa*, or *Sol*, in the minor key.

The fifth and fourth is resolved into the fifth and third, the fourth being the discordant note, which must fall to the note below, and must be prepared, or suspended from the preceding chord or discord.

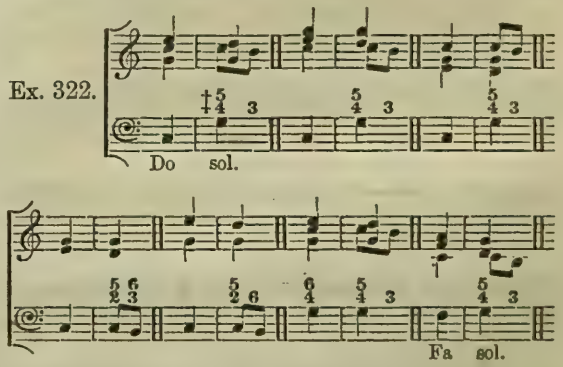
Ex. 321.



The only inversion of the fifth and fourth is the fifth and second; the other inversion of the seventh and fourth is never used on account of the fourth to the bass note, after its resolution.

The fifth and fourth on Sol in the major key may be prepared by the triads of Do, or of Fa, by the discord of Fa, and by the triad of *Do* in the minor key, and their inversions; as in the following example:—

Ex. 322.



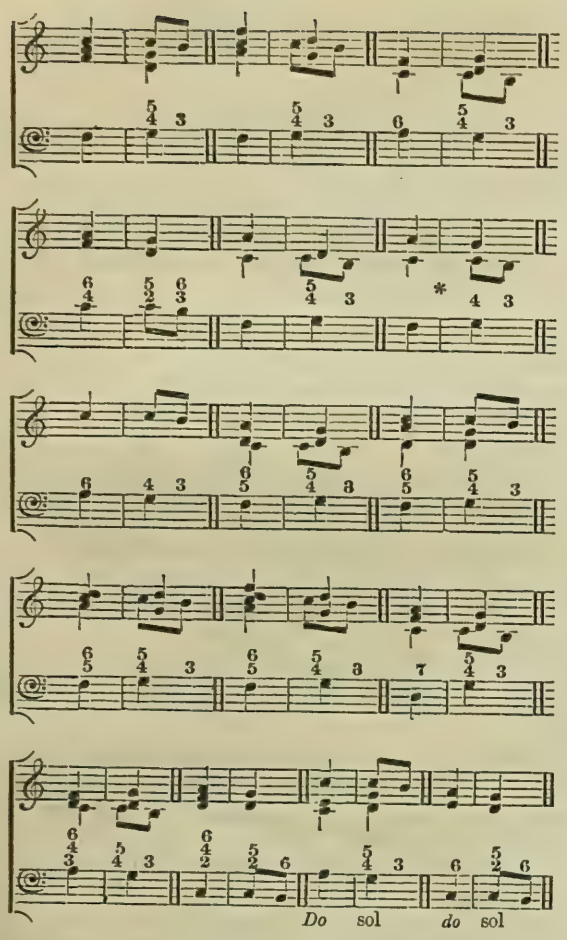
and sometimes as part of the chord, as—

Ex. 320.



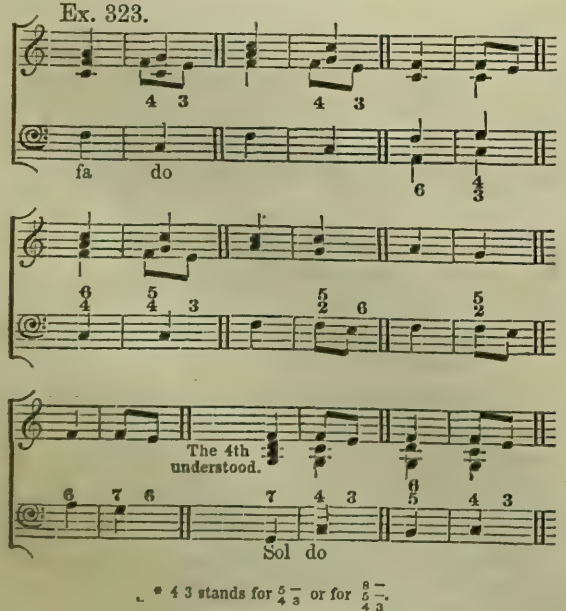
† It is sometimes used as an *unprepared* appoggiatura on Fa in modern music; and sometimes together with the ninth.

‡ $\frac{5}{4}$ stands for $\frac{8}{5}$.
$\frac{8}{4}$

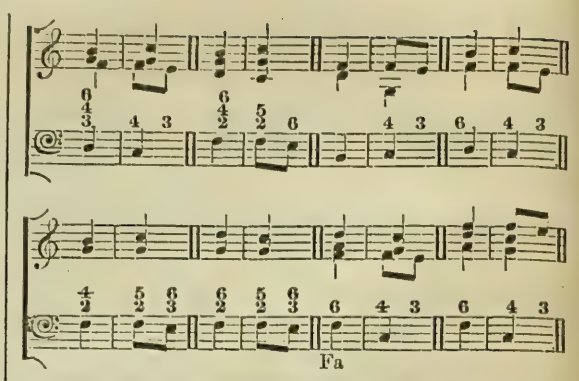


The fifth and fourth on Do may be prepared by the triad of Fa, by the dominant seventh, and their inversions, by the triad of *Fa*, in the minor key, and by Fa with a sixth and third; as in the next example:

Ex. 323.

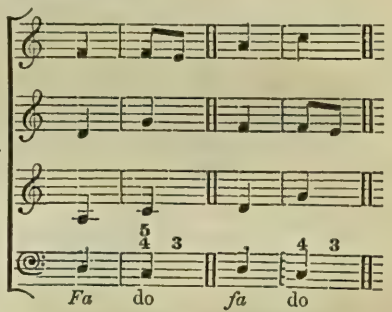


* 4 3 stands for $\frac{5}{4}\frac{-}{3}$ or for $\frac{8}{5}\frac{-}{4}\frac{-}{3}$.



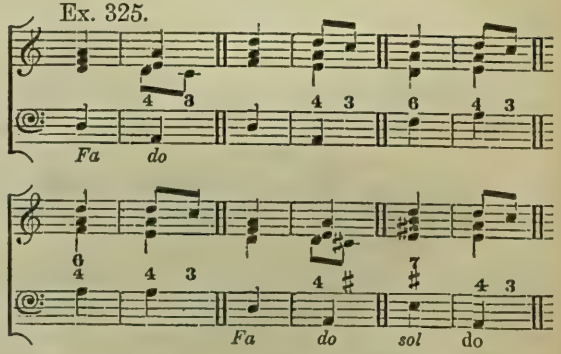
but this discord of the fifth and fourth must not be prepared by the sixth, fifth, and third on Fa, which could not be resolved if succeeded by the fifth and fourth. The fifth and fourth on Do, prepared by the triad of *Fa* in the minor key, is written in parts in the following example, to show how the discord is prepared or suspended:—

Ex. 324.



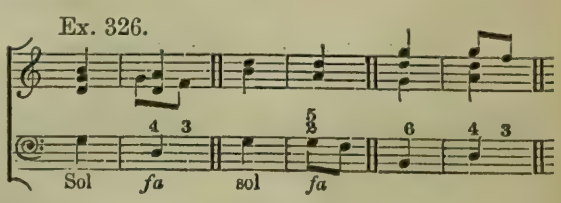
The fifth and fourth on *Do* in the minor key, may be prepared by the triad of *Fa* in the same key, or by the dominant seventh, and their inversions, with the same inversions, omissions, &c., as were used in the major key:—

Ex. 325.



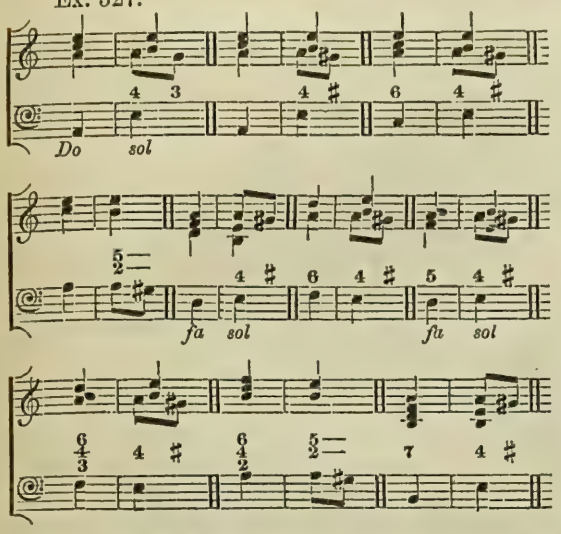
The fifth and fourth on *Fa* in the minor key is generally prepared by the triad of Sol in the major key:—

Ex. 326.



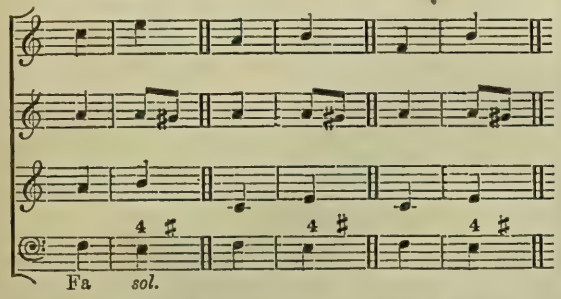
The fifth and fourth on *Sol* in the minor key may either be resolved into the major or minor triad of *Sol;* and may be prepared by the triad of *Do*, by the triad of *Fa*, by the discord of *Fa*, or sometimes by the triad of Fa in the major key, with their inversions, &c.

Ex. 327.



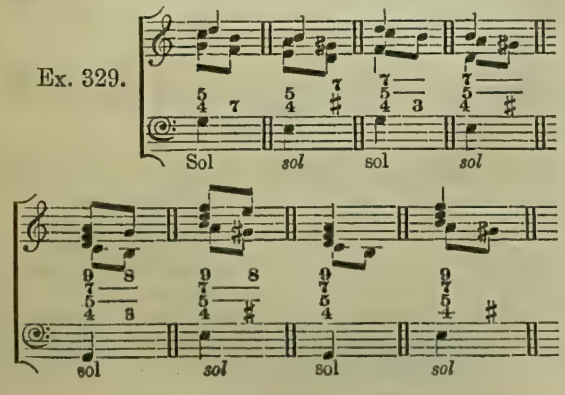
The way in which this discord may be prepared by the triad of Fa in the major key, is shewn in the next example :—

Ex. 328.



The fifth and fourth on Sol may likewise be resolved into the dominant seventh, and may be accompanied by the dominant seventh, and sometimes with the added ninth :—

Ex. 329.



As a discord of transition, it will likewise have different resolutions from the foregoing. See Discords of Transition.

The composer may vary the second simple diatonic succession—*i. e.*, that of rising fifths or falling fourths —by accompanying each bass note (excepting the first) with a $\frac{5}{4}{}_{3}$.

Ex. 330.



This has given rise to a beautiful passage frequently occurring in ancient music, which will never become obsolete or uninteresting :—

Ex. 331.



2nd. *The ninth, fifth, and third,* may be used either on Do, Fa, or Sol, in the major or minor key; the third to *Sol* in the minor being generally major. This discord has no inversions unless there is an omission of the fundamental note.

The ninth is the discordant note, and must fall to the eighth.*

The ninth, fifth, and third on Do may be prepared by the triad of Sol, by Fa with a sixth and third, or by the dominant seventh, and such of their inversions as are contained in the following example :—

Ex. 332.

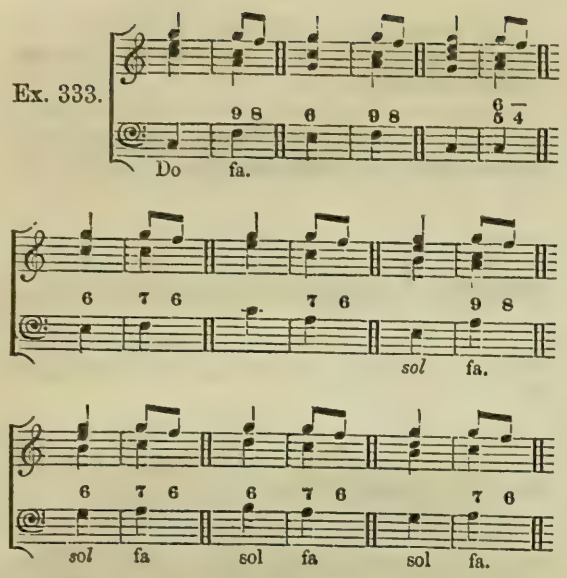


The ninth, fifth, and third on Fa is generally prepared by the triad of Do, or by that of *Sol* in the minor key; not often, if ever, by Sol in the major key, excepting as in the inversions.

* The ninth must fall to the note below; but sometimes the bass falls a third at the same time, or rises a third.

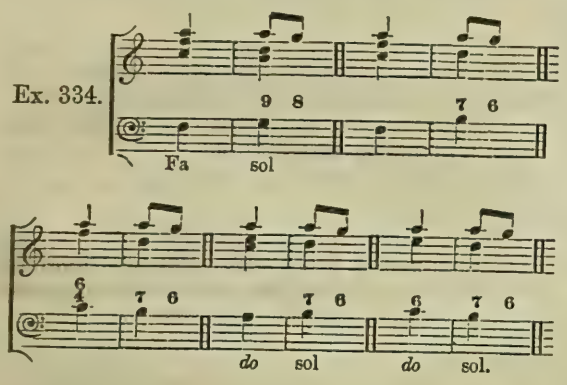
† 9 8 stands for $\frac{9}{5}\ \frac{8}{-}$ ‡ 7 6 stands for $\frac{7}{3}\ \frac{6}{-}$

Ex. 333.



The ninth, fifth, and third on Sol is prepared by the triad of Fa, seldom by that of *Do* in the minor key, excepting as in the inversions of the 9 8:—

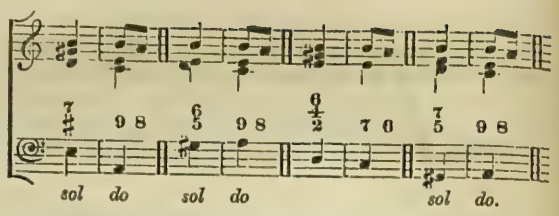
Ex. 334.



The ninth, fifth, and third on *Do* in the minor key may be prepared by the triad of Sol in the major key, by that of *Sol* in the minor key, by *Fa* in the minor key with a sixth and third, by the dominant seventh and some of its inversions, and by the leading seventh:—

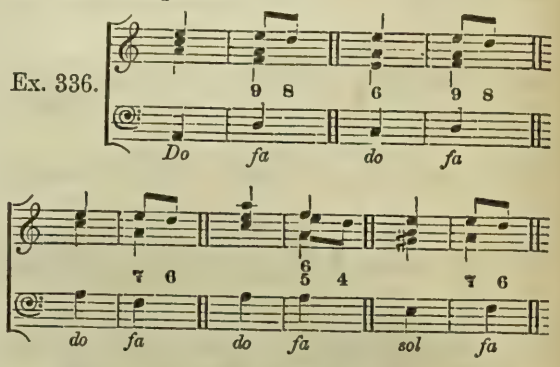
Ex. 335.





The ninth, fifth, and third on *Fa* in the minor key may be prepared by the triad of *Do*, by that of Do in the major key, or *Sol* in the minor key, as used in the next example:—

Ex. 336.



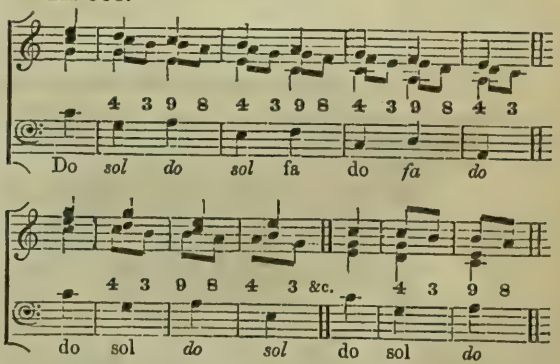
The ninth, fifth, and third on *Sol* is prepared by the triad of *Fa* in the minor key, or by Fa, as,—

Ex. 337.



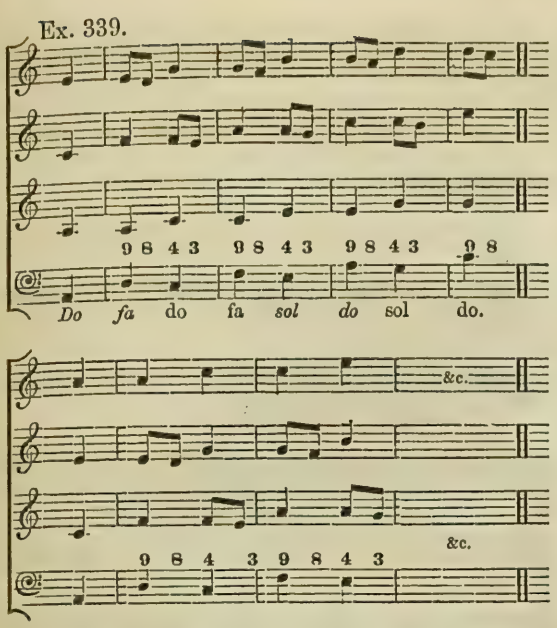
In the fourth mixed diatonic succession—*i. e.*, rising fifths and seconds alternately, or falling fourths and sevenths alternately—the fifth and fourth, and the ninth, fifth, and third may be alternately used, as in the following example:—

Ex. 338.



In the third mixed diatonic succession also—*i. e.*, falling fifths and seconds alternately, or rising fourths and sevenths alternately—the fifth and fourth, and the ninth, fifth, and third, may be alternately used, as in the next example, which is written in parts to show how the discords are prepared:—

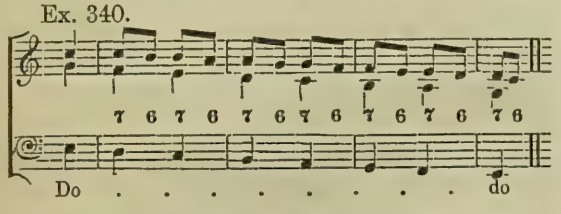
Ex. 339.



3rd. *The seventh and third* (which has been considered as one of the discords derived by omission from the ninth, fifth, and third) may be used as a suspended discord on any note of the scale. The seventh is the discordant note, and must fall to the sixth.

Thus the succession of sixes may be converted into a succession of these discords :—*

Ex. 340.



* When a fifth and third, succeeded by a sixth, appears on each note of an ascending bass, the author of the present work cannot help regarding the fifth as an unessential note, a sort of appoggiatura resolved irregularly upwards into the sixth, as the seventh was downwards.

Ex. 341.



[5 6 stands $\frac{5}{3}$ $\frac{6}{-}$ no 8.]

When, however, the first part only of the passage is used, it may be regarded, as it indeed is by most authors, as an inversion of the first mixed diatonic succession. [See Example 127.] But the latter part of the passage cannot be so derived.

Ex. 342.



This discord, being a prepared appoggiatura on a sixth and third, ought not, perhaps, to have any fifth; yet many instances may be found in the works of the best composers, where the fifth seems to be inserted merely for the sake of making the harmony fuller. The fifth is always omitted in the resolution.

Ex. 343.

Thus the half close:—



Ex. 344.

is used by Corelli thus:—



Ex. 345.

And thus:—



Ex. 346.

may be converted into:—



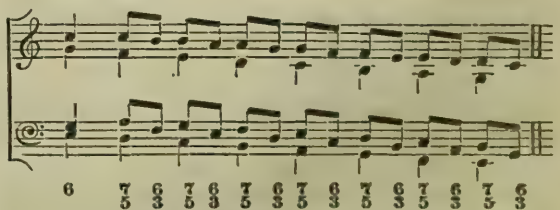
Ex. 347.

This, however, may be otherwise derived, thus:—



The whole succession is sometimes so accompanied, as in the following example:—

Ex. 348.



The seventh and third, succeeded by a sixth, is sometimes inverted as a fourth and second, the bass note then being the discordant note. A succession of these may be found, but is not recommended.

4th. *The seventh, fifth, and third on* Fa, is prepared either by the triad of Do in the major key, or of *Do* in the minor key, and is resolved into the discord of Fa; the seventh, fifth, and third on *Fa*, is prepared either by the triad of *Do*, or of Fa, and is resolved into the discord of *Fa*, as in the subjoined examples:—

Ex. 349.



Ex. 350.



This discord is sometimes used without preparation; sometimes irregularly resolved, and sometimes unaccented.

It is sometimes preceded by the dominant seventh.

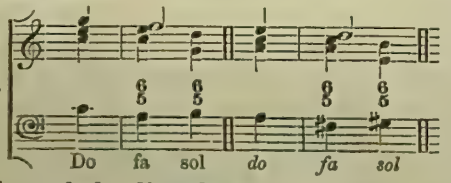
It is sometimes resolved into the sixth and fourth on Sol, when it is generally unaccented:—

Ex. 351.



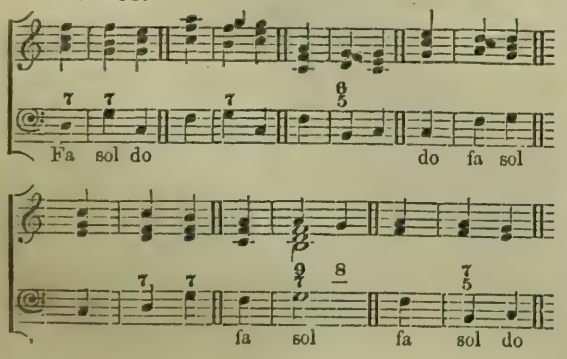
When inverted, as a sixth and fifth, this discord is often resolved into the dominant seventh, inverted as a sixth and fifth:—

Ex. 352.



5th. Any of the discords of addition may be accented, prepared, and resolved, as discords of suspension.

Ex. 353.



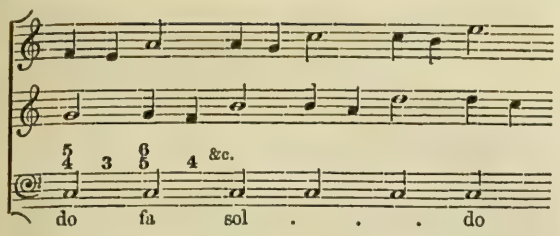
6th. Suspended discords may be used with a holding note in the bass, called, in this work, the pedale: such are the seventh and sixth, sixth and fifth, fifth and fourth, fourth and third, ninth and third, ninth and eighth, and the eighth and seventh.

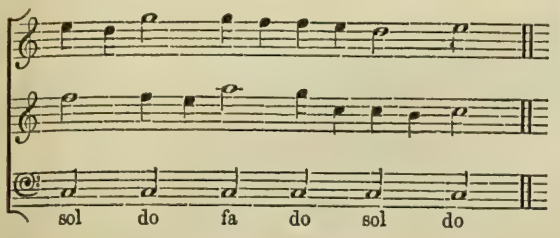
This pedale, or holding note in the bass, is generally Sol, sometimes Do, but seldom Fa:—

Ex. 354.

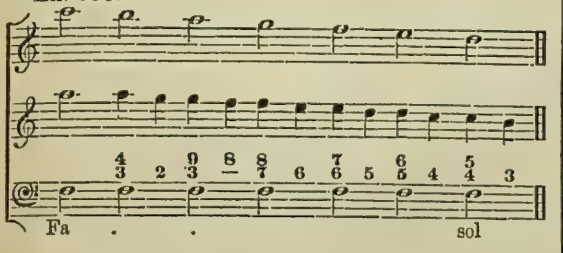


Ex. 355.





Ex. 356.



The derivation of some of these is at present unintelligible to the student, as they come from the discords of transition.

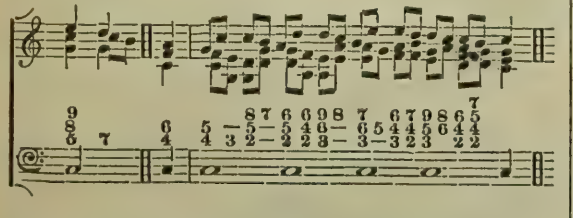
The young composer is recommended to be sparing in the use of the pedale on Fa; and to be careful to have sufficient authority for any passage of the kind he uses.

The pedale * on Sol or Do may be used with all the discords of suspension, as well as those of transition, and, indeed, with almost every kind of passage whatever.

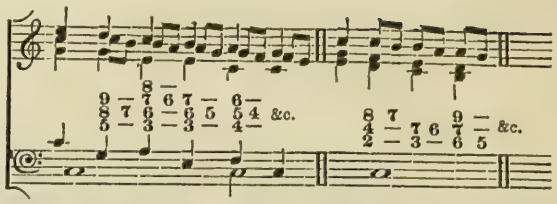
This causes an endless diversity of figures, and an apparent irregularity of resolution, which disappears if the student considers the passage without the pedale note.

Several discords of suspension on a pedale are shown in the next example:—

Ex. 357.



* The pedale bass probably had its origin in the music composed for the bagpipe, the drone of which is still imitated in all pastoral music. It is a species of Faburden mentioned page 23.



7th. Among discords of suspension are likewise placed all double discords, in which two or more notes are suspended and resolved together.

As the ninth and fourth, or ninth, fifth, and fourth:—

Ex. 358.



The ninth and seventh, or ninth, seventh, and third:—

Ex. 359.



The ninth, seventh, and fourth:—

Ex. 360.



The ninth, seventh, fifth, and third:—

Ex. 361.



The seventh, fifth, fourth, and second † on Do:—

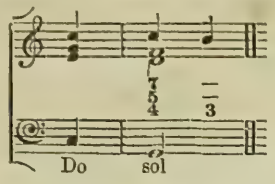
Ex. 362.



† The seventh, fifth, fourth, and second, on Do, is the dominant seventh, with a pedale bass on Do; Fa falls, but Si rises according to the rules already given for the resolution of the dominant seventh. It has been written $\frac{11}{9}{}^{7}_{3}$ by some authors.

The seventh, fifth, and fourth on Sol :—

Ex. 363.



The ninth, seventh, fifth, and fourth on Sol :—

Ex. 364



And perhaps some others used occasionally by such composers as excel in intricate harmony.

III. *Discords of Transition.*

Discords of Transition are so called because the generality of them consist of passing notes,* combined with holding notes; and they are generally unaccented. The principal of these are :—

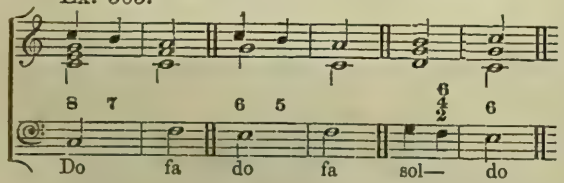
1st. The eighth, followed by the seventh, and its inversions; also the fifth, followed by the sixth; the third, by the fourth, &c.

2nd. Notes ascending or descending diatonically, with one or more holding notes in the other parts, as the fourth and second, and its inversions.

3rd. Discords of addition, on a pedale, not prepared, as the sixth, fourth, and second; seventh, fifth, fourth, and second, &c.

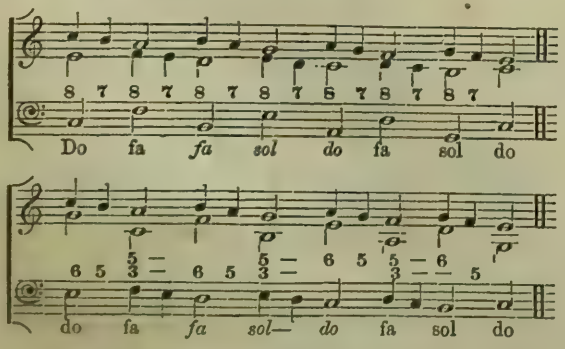
1st. The eighth, followed by a seventh and its inversions, is shewn in the following example :—

Ex. 365.



It may be used on each note of the scale, as in the first simple diatonic succession :—

Ex. 366.



* Unessential notes, and passing notes, will be hereafter defined.

Of this kind of discord also are the fifth, followed by a sixth,† and the third by a fourth, and all other similar processes wherein the latter note, though not discordant, is unessential, unaccented, and figured in the thorough bass :—

Ex. 367.



2nd. Notes ascending or descending diatonically, with one or more holding notes in the other parts.

Ex. 368.



† The 6 after a 5, and the 4 after a 3, are not discordant notes, but rather unessential notes.



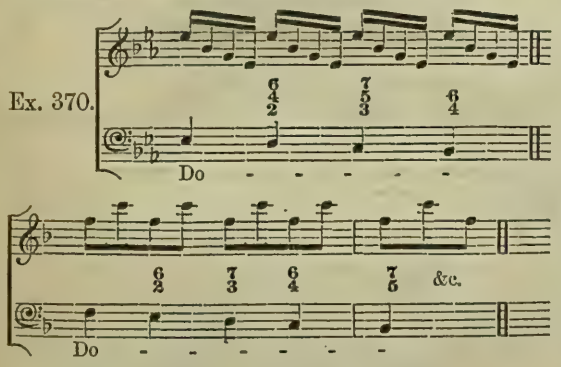
These produce a variety of figures, the principal of which are the fourth and second on Do, Fa, or Sol, and its inversions :—

Ex. 369.



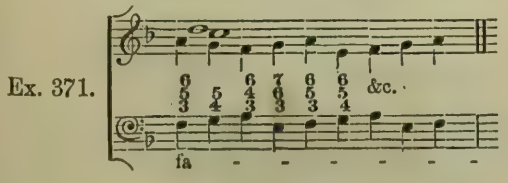
The chord of Do, or part of it sustained :—

Ex. 370.



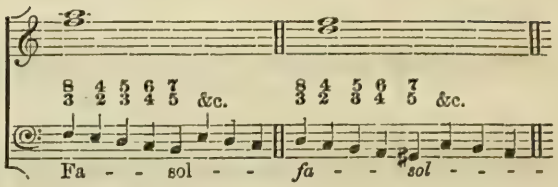
The sixth and fifth to Fa sustained :—

Ex. 371.



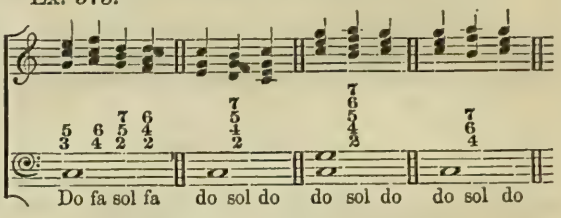
The eighth and third to Fa :—

Ex. 372.



3rd. Triads, sixes, and discords of addition, not suspended, may be used on a pedale :—

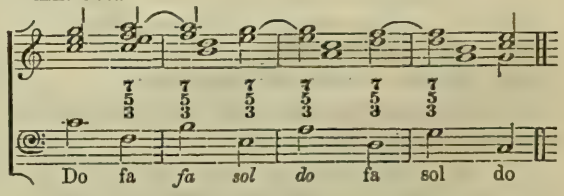
Ex. 373.



IV. *Discords of Syncopation.*

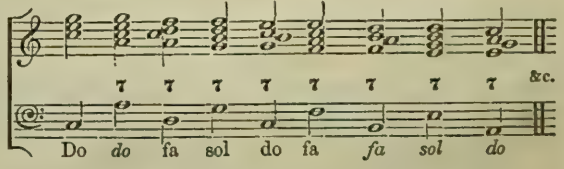
Discords of Syncopation are so called because in ancient music they were written in syncopated notes, *viz.*, notes beginning always on the unaccented part of the bar. The discordant notes must always be prepared :—

Ex. 374.



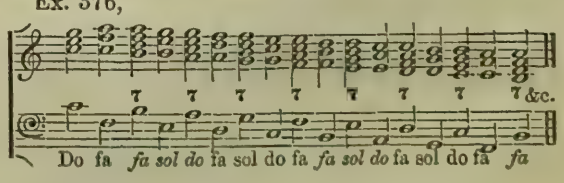
These discordant notes are a seventh, fifth, and third, on each bass note, or on every alternate bass note, of the first simple diatonic succession. For the seventh, fifth, and third on each bass note, see the following example :—

Ex. 375.



This passage is seldom, if ever, inverted. For the seventh, fifth, and third, on alternate bass notes, see the next example :—

Ex. 376,



This passage admits of certain inversions, as in the subjoined passage :—

Ex. 377.



Chromatic Harmonies.

Chromatic Harmonies are such as are peculiar to the chromatic scale, page 7, not including such chromatic discords as are mere transpositions of diatonic discords from the major into the minor key. They always occasion an alteration of flats and sharps without a change of key. The principal chromatic harmonies are—

1st. Chromatic passing notes.
2nd. Certain discords of transition altered.
3rd. The minor ninth to Sol and its omissions.
4th. The discords of Fa sharp.*
5th. The Italian, German, and French sixes.
6th. The Neapolitan sixth.
7th. The flat seventh to the key note.

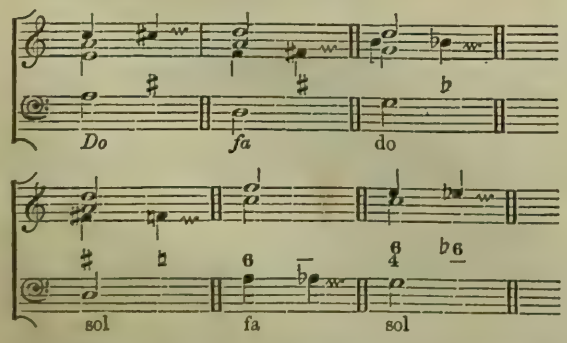
1st. Chromatic passing notes are numerous as the extreme sharp fifth :—

Ex. 378.



Minor thirds after major in the same key, or *vice versa*, and their inversions :—

Ex. 379.



* By Fa sharp is meant the half note above Fa. Thus, in the key of c major, Fa sharp is F♯; in the minor key of A, *Fa* sharp is D♯. Amongst flats, Fa sharp will of course be a natural; in the key of B♭ it is E♮.

The octave sharpened :—

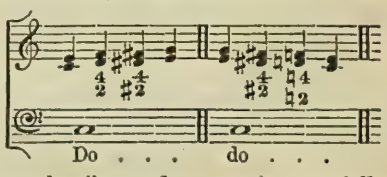
Ex. 380.



and various others.

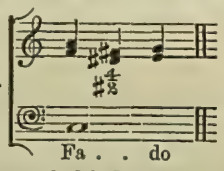
2nd. The sharp fourth and sharp second are sometimes used as passing notes:—

Ex. 381.



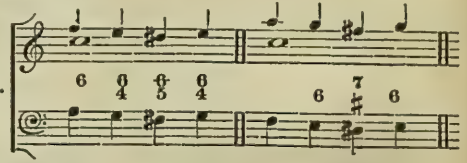
and frequently (in modern music especially) used instead of the diatonic fourth and second. †

Ex. 382.



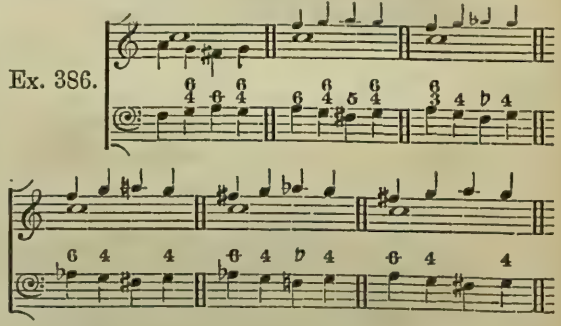
The inversions of this harmony are shewn in the next example :—

Ex. 385.



Other passages of a similar kind are subjoined :—

Ex. 386.



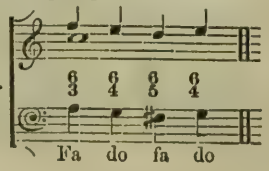
† J. C. Bach uses the fourth sharpened without sharpening the second :

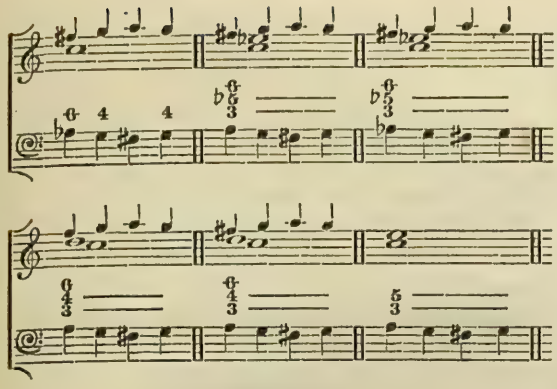
Ex. 383.



The inversions of this passage are not uncommon :—

Ex. 384.





Minor key of A.



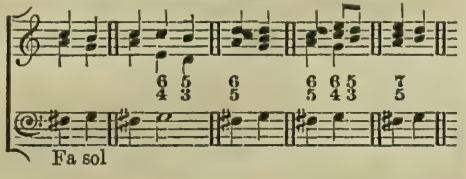
3rd. The minor ninth to Sol in the major key, and its omissions, are shewn in the following example :—

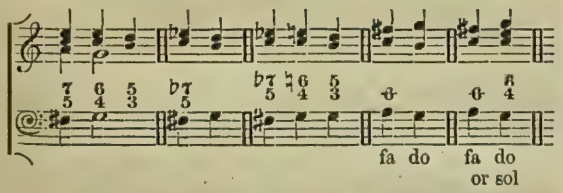
Ex. 387.



4th. Examples of Fa sharp, with its discords, are subjoined. This discord may be resolved either into the triad, or the sixth and fourth, on Sol :—

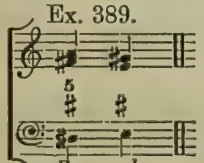
Ex. 388.



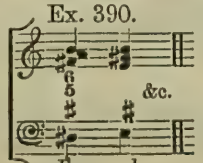


In the minor key the third to *Fa* sharp must also be sharp, otherwise the third would be extreme flat:

Ex. 389.



Ex. 390.



The flat seventh on Fa sharp in the major key, especially after the sixth and fifth on Fa, is often inverted and written as an extreme sharp sixth and fifth, but is then always resolved into a sixth and fourth on Sol :—

Ex. 391.



5th. The Italian, German, and French sixes * are extreme sharp, both in the major and minor key; and are inversions of the triad of Fa. They are never inverted.†

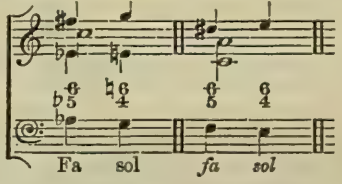
The Italian sixth is accompanied with a third, and is resolved either into the triad of Sol, or the sixth and fourth on Sol :—

Ex. 392.



The German sixth is accompanied with a fifth and third, and is resolved only into Sol with a sixth and fourth :—

Ex. 393.



The French sixth is accompanied with a fourth and third, and may be resolved into either the triad of Sol, or the sixth and fourth on Sol.‡

Ex. 394.



6th. The Neapolitan sixth is a minor third and a minor sixth, both in the major and minor keys, to Fa, and is very seldom inverted. It is resolved into the triad of Sol :—

Ex. 395.



* These and the Neapolitan sixes are denominated after the nations which invented them, or most frequently used them.

† *Rousseau asserts that this harmony (the extreme sharp sixth) is never inverted. Framery (Art.* Accord*) has shewn from a Passione of Paisiello that its inversion may be used, and we have an example in Weldon's Anthem, "Hear my crying."—Boyce's Cathedral Music, Novello's Edition, vol. ii., p. 539. See Callcott's Musical Grammar, 3rd edition, p. 238.*

‡ It has been asserted that this discord is only to be found in French treatises; the author of this work has, however, seen it in a song by Hasse.

into the sixth and fourth on Sol:—

Ex. 396.



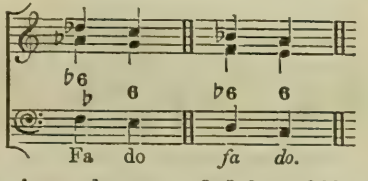
into the diminished seventh on Fa sharp:—

Ex. 397.



or into the triad of Do, inverted as a sixth and third:

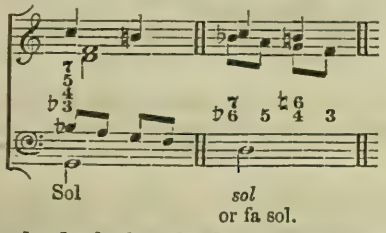
Ex. 398.



It is sometimes also succeeded by a fifth; and has been used on the key note, and followed by Fa sharp.

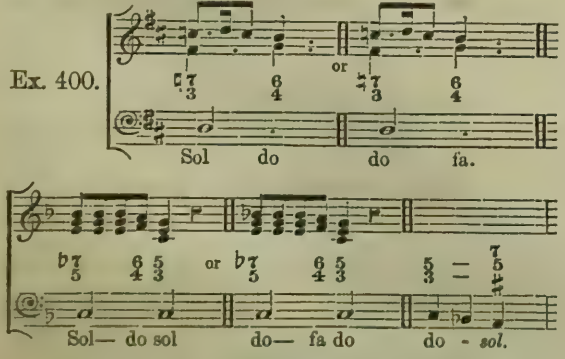
7th. Flat sevenths of the key are occasionally met with, which do not seem to change the key: such is the fifth, fourth, and flat third on Sol, used by Purcell and others;* and its inversions:—

Ex. 399.



It is doubted whether the flat seventh to the key note, used with a fifth and third very commonly in national and other music, ought to be considered a change of key; and whether the key is affected by the flat seventh, used frequently in the bass previous to a modulation:—

Ex. 400.



* In the works of Purcell, Dom^co. Scarlatti, Haydn, Mozart, Rossini, and other inventive geniuses, discords may be found not mentioned in this work; the foregoing are, however, the principal of those commonly used.

CHAPTER IV.

Of Melody.

Melody is a succession of single notes; but in scientific music it is considered as forming the accompaniment, or else the bass, of some harmony either expressed or understood.†

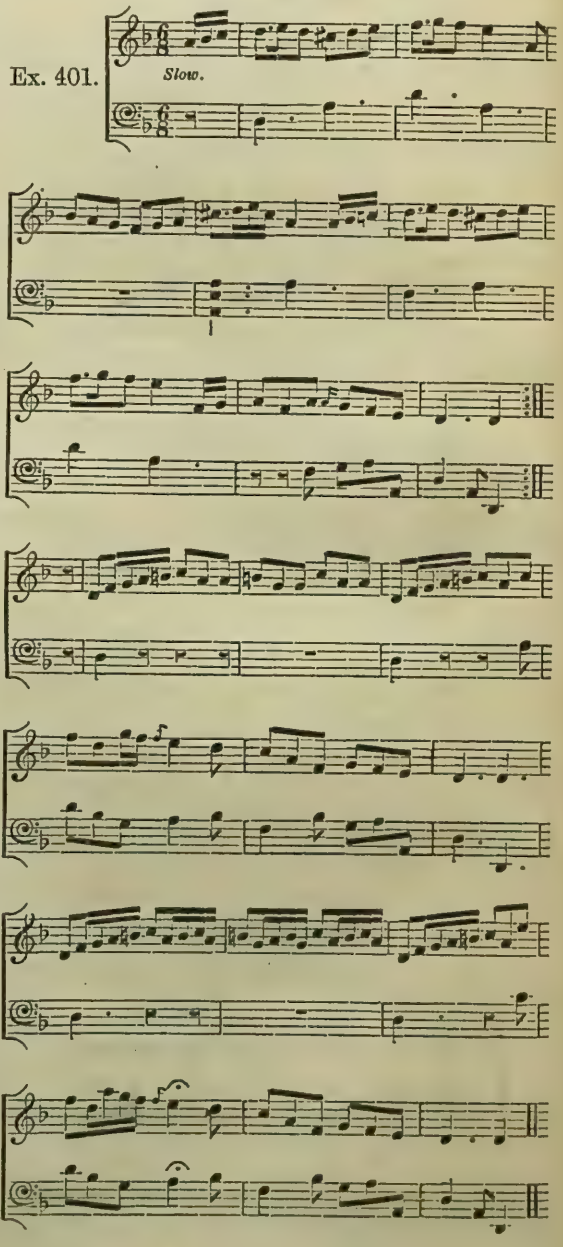
Melody consists of essential and unessential notes.

1st. Essential notes are such as form a part of the

† A few melodies in national music have been found incapable of harmony; such as the first two bars of the second part of the Irish tune, called "The Fair Haired Child."

The Fair Haired Child.

Ex. 401.



harmony. They may be either written in plain or florid counterpoint.†

2nd. Unessential notes are such as form no part of the harmony, and are not figured in the thorough bass; they are, therefore, never used without essential notes, and, together with them, always constitute florid counterpoint. They are of four kinds:—

1st. Passing notes.
2nd. Appoggiaturas.
3rd. Adjunct notes.
4th. Notes of anticipation.

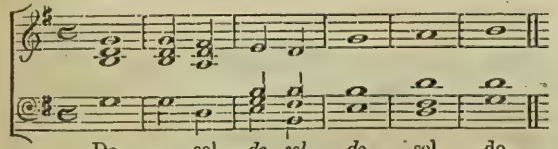
1st. Passing notes are placed between one essential note and another, by a regularly ascending or descending melody. They are generally unaccented, but sometimes accented. When the essential notes are a fourth apart, two passing notes will sometimes succeed each other. In the following example, each passing note is marked by a figure 1 placed over it:

Ex. 405.



† Counterpoint is another term for harmony, or the writing the points or heads of the notes counter, opposite, or rather under each other. Plain counterpoint is when the notes of the accompaniment are of the same length with those in the subject, as—

Ex. 402.



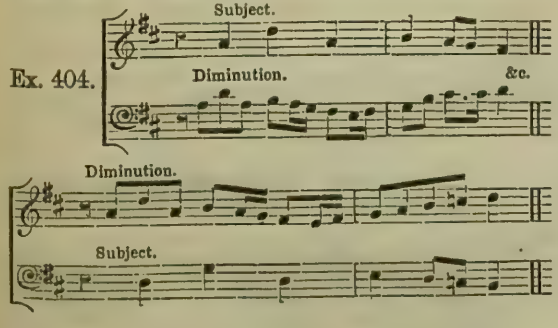
Florid counterpoint is where the length of the notes, in the different parts, is various.

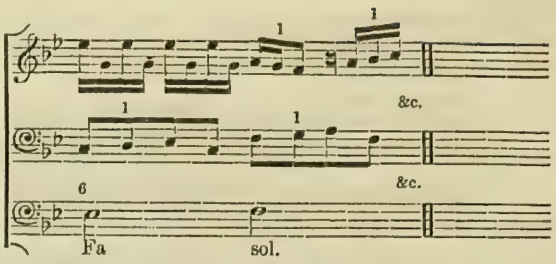
Ex. 403.



The rules of counterpoint are not given in this work, as they seem to have become obsolete. The study of double counterpoint, or of making an accompaniment to a given subject, which may be used either below it, as a bass, or above it, is useful, especially in making fugues. In the subjoined example, the same accompaniment is used an 8ve. below the subject, and a 12th above it:—

Ex. 404.





Passing notes are occasionally chromatic, as,—

Ex. 406



2nd. Appoggiaturas are accented notes placed before essential notes, at the distance of one note either above or below them, as in the next example, where each of the appoggiaturas is marked by a figure 2 over it:—

Ex. 407.



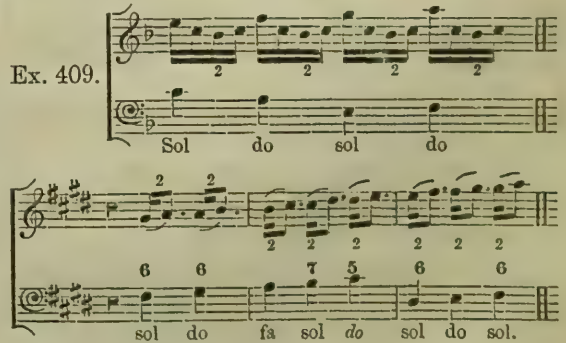
In the subjoined example, the passing notes and appoggiaturas are marked as before:—

Ex. 408.



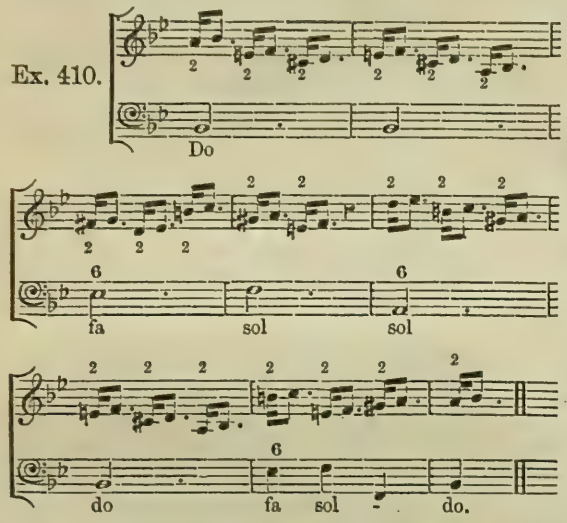
Appoggiaturas placed below the essential note, are shown in the next example:—

Ex. 409.



When appoggiaturas are placed below the essential notes, they are frequently made chromatic by being raised one semitone, as,—

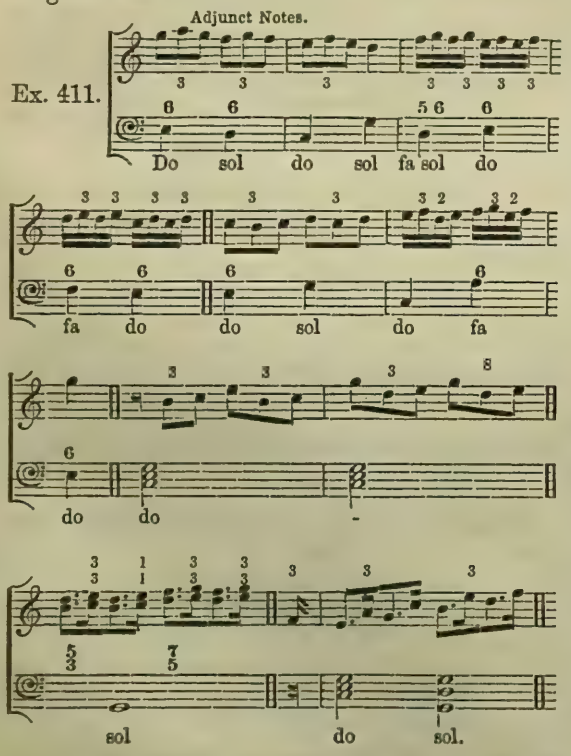
Ex. 410.



3rd. Adjunct notes are unaccented, and placed before or after essential notes, one note above or below them.

In this example, the adjunct notes are marked by a figure 3 :—

Ex. 411.



They are frequently raised one semitone when placed below the essential notes.*

* The author considers adjunct notes as the most difficult of any for the student to use correctly, or agreeably, unless he is guided by a very good ear and taste, and relies on the authority of good composers for the manner of adopting them.

Ex. 412.



4th. Notes of anticipation are unaccented, following the essential notes, and belonging to the succeeding chord; they are marked by a figure 4, in the following examples :—

Ex. 413.

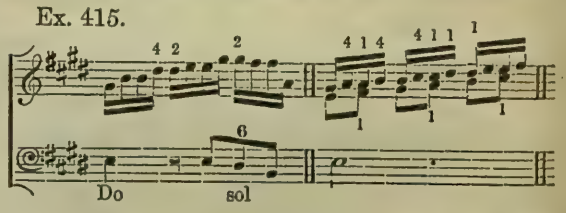


Ex. 414.



Appoggiaturas and passing notes may be preceded by notes of anticipation, as in the next example :—

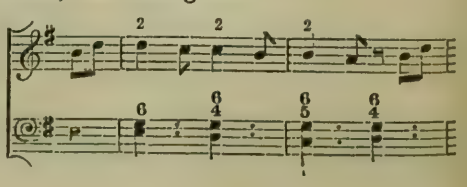
Ex. 415.



Sometimes two appoggiaturas will be found together.

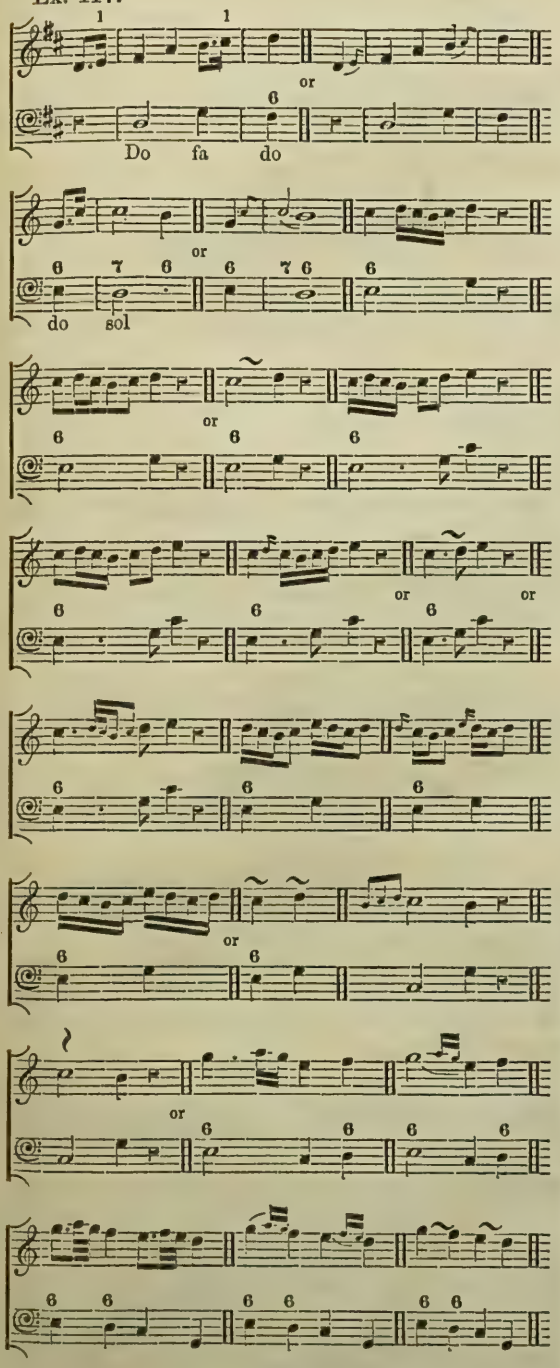
Passing notes, appoggiaturas, and notes of anticipation, are frequently expressed in little notes as well as large ones, or in different characters, as turns, inverted turns, and other graces :—

Ex. 416.





Ex. 417.



Passing notes in melody differ from those in discords of transition only by not being figured in the thorough bass.

CHAPTER V.

Of Music in Parts.

By music in parts is here meant such as is intended for a number of voices, instruments, or both together, written in score, *viz.*, in separate lines one under another.

Music in parts may consist either, first, entirely of real parts; or, secondly, of real parts with others added, merely for the sake of effect.

The bass, or lowest part, should consist, generally, of the fundamental note, or of the third, but not of the fifth note of the chord.*

The same rules apply to the treble and bass, whether there are many, few, or no parts contained between them.

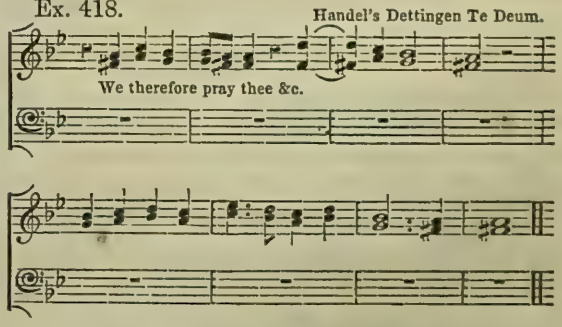
Glees, trios, quartetts, &c., are usually written in a score consisting of real parts.

2ndly. There are various ways of deviating from the strictness of real parts for the sake of effect; such as by a passage consisting entirely of unisons or octaves, or by one in which some of the parts are in octaves or unisons with each other, while the rest are distinct.

Anthems have a bass line for the organ, under the bass voice part, and chiefly in unison with it, to which are affixed the figures of the thorough bass. In symphonies, and other full instrumental music, the two violins and the bass, or the two violins, viola, and bass, are real parts. In oratorio choruses, the voice parts are real; the vocal and instrumental basses are generally in unison when they perform together; and the two violins and viola form real parts when distinct from the voices. In songs, the violins, viola, voice, and bass, form real parts; or one of the violins may be in unison with the voice. The student will, however, be better able to acquire this kind of experience from the study of the works of good masters than from that of an elementary treatise.

Sometimes the bass is omitted entirely for the sake of effect; and the other parts remain the same as if it were retained.

Ex. 418.



Tasks or Exercises for the Student.

The student, having proceeded thus far, is recommended, 1st, to make scores of all the preceding examples (not already written in parts) in as many lines as may be required.

* A chord containing a fourth in the thorough bass, may, however, be occasionally used, provided the fourth is not expressed, but merely understood.

2ndly. To harmonize, or make scores, of any simple composition, as a chant or psalm,* consisting only of a treble, or of a treble and bass; and these scores may consist of three, four, five, six, seven, or eight parts.

3rdly. To make a new harmony to a given bass, or inner part.

To perform either of these tasks, the student should be well acquainted with all the clefs in general use.

Ex. 419.



4thly. To transpose all the foregoing examples into various keys.

5thly. The first attempt which the student should make at original composition may be preludes, or a series of chords, written without bars, and without any other change of key than that into the relative key already described.

6thly. The first attempt at music in time should consist merely of semibreves and minims, or of any other simple notes, care being taken that the suspended discords and the cadences are properly accented.

In order to do this, the student should be acquainted with every kind of time.

Of Rhythm or Time.†

Rhythm, or time, is of two kinds, common and triple. Common time contains two equal notes in each measure or bar, as two semibreves, two minims, two dotted minims, &c.

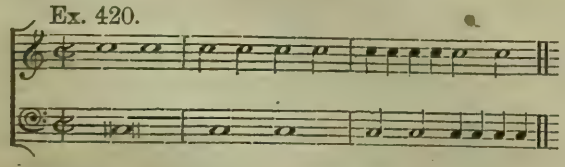
Triple time contains three equal notes in each measure, as three minims, three crotchets, three dotted crotchets, &c.

Common time is of two kinds, simple and compound.

In simple common time, the two equal notes of which the measure or bar consists, are not dotted, but are either semibreves, minims, or crotchets.

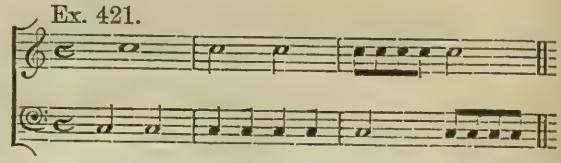
The time which has two semibreves is called *Alla Breve* time.

Ex. 420.



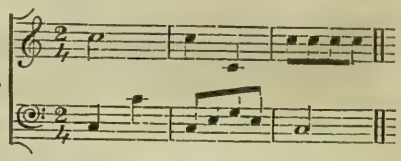
That which has two minims, is shown in the following example :—

Ex. 421.



Two crotchets are marked $\frac{2}{4}$, *viz.*, two fourths of a semibreve, thus :—

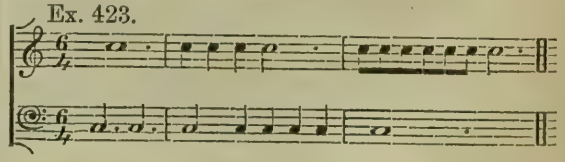
Ex. 422.



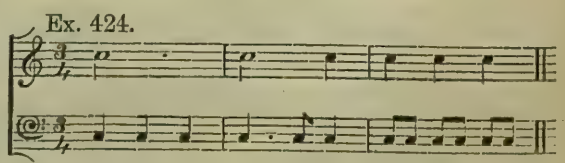
In compound common time, the two equal notes are dotted, and are either two dotted minims and six crotchets, two dotted minims and four dotted crotchets, or two dotted crotchets.

The time which has two dotted minims and six crotchets is marked $\frac{6}{4}$, *viz.*, six fourths of a semibreve, and is compounded of two bars of the time marked $\frac{3}{4}$:—

Ex. 423.



Ex. 424.



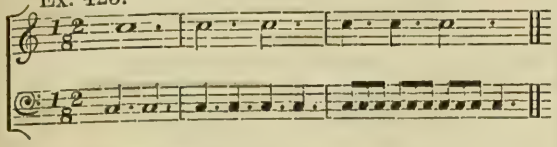
That which has two dotted minims and four dotted crotchets, is marked $\frac{12}{8}$, *viz.*, twelve eighths of a

* These tasks should be instrumental rather than vocal pieces.

† The author has thought it necessary to insert some things in this work with which the student ought, previously, to be thoroughly acquainted,—as the explanation of the clefs, and of the different sorts of time: he was induced to do so, from having observed that these particulars are not always taught, or if taught, are apt to be forgotten by the pupil, who, in other respects, may be enabled to understand the elements of musical composition and thorough bass.

semibreve, and is compounded of four bars of the time marked $\frac{3}{8}$:—

Ex. 425.

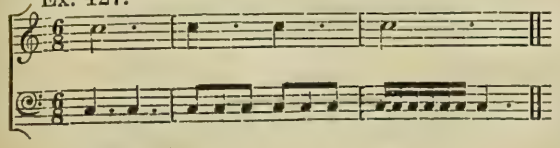


Ex. 426.

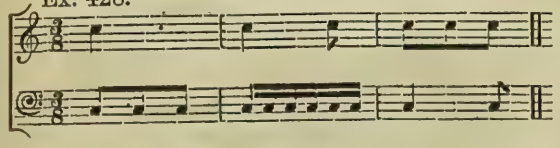


That which has two dotted crotchets is marked $\frac{6}{8}$, *viz.*, six eighths of a semibreve, and is compounded of two bars of the time marked $\frac{3}{8}$:—

Ex. 427.



Ex. 428.

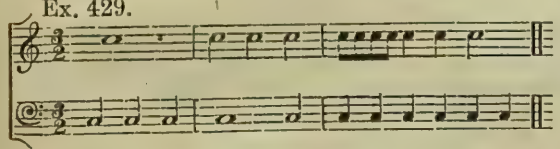


Triple time is either simple or compound.

In simple triple time, the three notes of which the bar consists are not dotted, but are either minims, crotchets, or quavers.

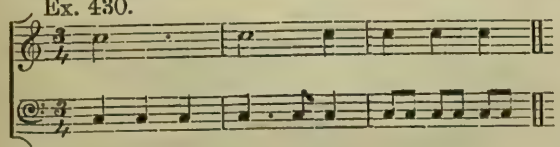
The time which contains three minims in a bar is marked $\frac{3}{2}$, *viz.*, three notes, each equal to the half of a semibreve :—

Ex. 429.



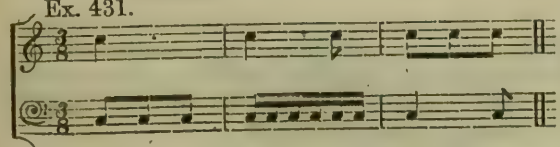
That which has three crotchets is marked $\frac{3}{4}$, *viz.*, three fourths of a semibreve :—

Ex. 430.



That which has three quavers is marked $\frac{3}{8}$, *viz.*, three eighths of a semibreve :—

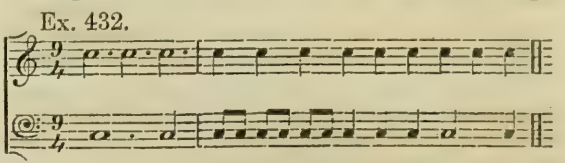
Ex. 431.



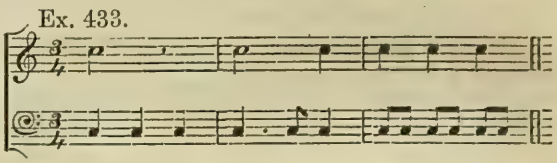
In compound triple time, the three equal notes of which the bar consists, are either dotted minims, or dotted crotchets.

The time which has three dotted minims in a bar is marked $\frac{9}{4}$, *viz.*, nine fourths of a semibreve, and is compounded of three bars of the time marked $\frac{3}{4}$:

Ex. 432.



Ex. 433.



That which has three dotted crotchets is marked $\frac{9}{8}$, *viz.*, nine eighths of a semibreve, and is compounded of three bars of the time marked $\frac{3}{8}$:—

Ex. 434.



Ex. 435.



Mixed measure is where a crotchet is divided into three quavers or a minim into three crotchets, &c. :—

Ex. 436.



The time called Alla Breve, and that marked $\frac{6}{4}$, $\frac{12}{8}$, $\frac{3}{2}$, and $\frac{9}{4}$, is peculiar to ancient music; that marked $\frac{9}{8}$ is not common in modern music.*

CHAPTER VI.

Of Modulation.

Modulation signifies a change of mode or key. Modulation is of three kinds—diatonic, chromatic, and enharmonic.

1st. For diatonic modulation, see the simple and mixed diatonic succession of the triads, page 15, &c.

2nd. Chromatic modulation implies an alteration in the disposition of the semitones, by increasing or

* The student is supposed to be acquainted with the length of notes and rests, and all other such particulars, previous to his commencing composer; for unless he can read music well, and perform on a keyed instrument, the study of composition and thorough bass will be unattainable.

diminishing the number of flats or sharps. It is of two kinds, natural and unnatural. See Chromatic successions, page 18.

1st. Natural modulation, in this work, signifies the going into such keys as are most immediately related to the original key of the piece or movement, *viz.*, the keys of the dominant, the subdominant, the relative, and its dominant and subdominant keys.

Thus, for example, the keys into which a natural modulation may be made, from the major key of C, are G major, the dominant; F major, the subdominant; A minor, the relative minor; E minor, its dominant; and D minor, its subdominant.

And thus from A minor, the natural modulations are into E minor, the dominant; D minor the subdominant; C major, the relative major; G major, its dominant; and F major, its subdominant. In other words, the keys thus intimately related, have only one flat or sharp, more or less, than the original key. And these keys are also represented by the chords, Do, Fa, and Sol, of the original and relative keys, being those which may be used together in the same diatonic scale. Thus in the diatonic scale of naturals, the chords which may be used without changing the scale, answer to the names of the keys into which a natural modulation may be made: *viz.*, C major, G major, F, major, A minor, E minor, and D minor.

2nd. Unnatural modulation, in this work, signifies modulation into any keys not intimately connected (as above) with the original key: or in other words, into such keys as have more than one flat or sharp, more or less, than the original key, and which cannot be represented by the triads of Do, Fa, and Sol, of the major and relative minor keys.

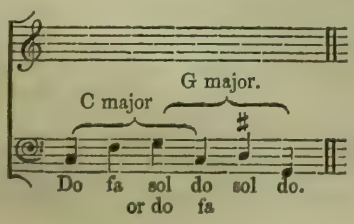
Thus, for example, a modulation from C major, into the keys of C minor, G minor, F minor, A major, E major, D major, B minor, B flat major, &c., is, in this work, called unnatural. So also, from A minor into A major, E major, D major, C minor, G minor, F minor, &c.

Chromatic modulation, whether natural or unnatural, may be effected in two different ways—by gradual and by sudden modulation.

1st. Gradual modulation signifies such as is effected by doubtful chords, or chords common both to the original key and to that into which the modulation is made.

Major triads are doubtful chords, as in the following passage, where the third and fourth chords may be either Sol, Do, in the key of C major, or Do, Fa, in G major:—

Ex. 437.

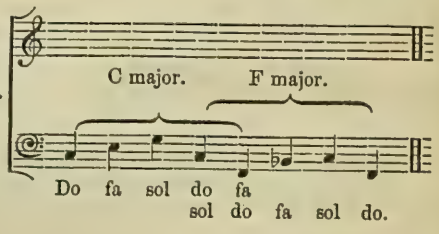


Further examples will be found below:—

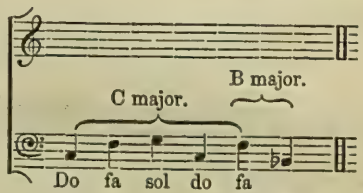
Ex. 438.



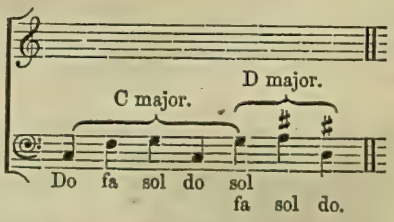
Ex. 439.



Ex. 440.

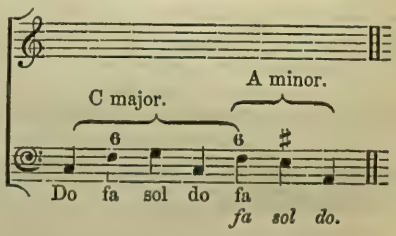


Ex. 441.

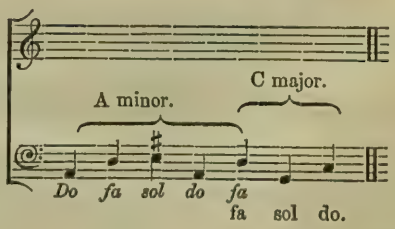


The triad of *Fa*, in the minor key, may be converted into Fa with a sixth and a third in the major key. See pages 23 and 32:—

Ex. 442.



Ex. 443.

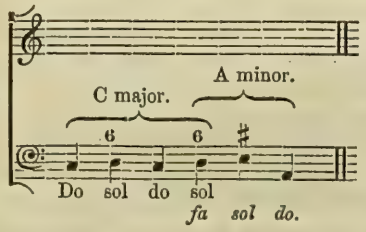


Fa in the minor key, with a sixth and third (the fifth being understood), may be converted into Re with a sixth and third in the major key, or the second inversion of the dominant seventh (the fourth being understood), and *vice versa*, as,—

Ex. 444.

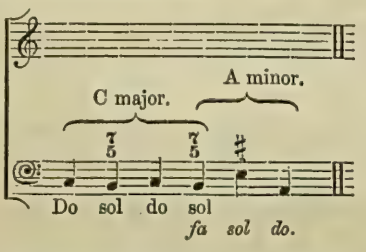


Ex. 445.

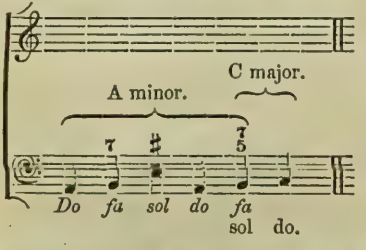


The leading seventh in the major key, is convertible into the added sixth in the minor key inverted, as a seventh, fifth, and third, and *vice versa* :—

Ex. 446.



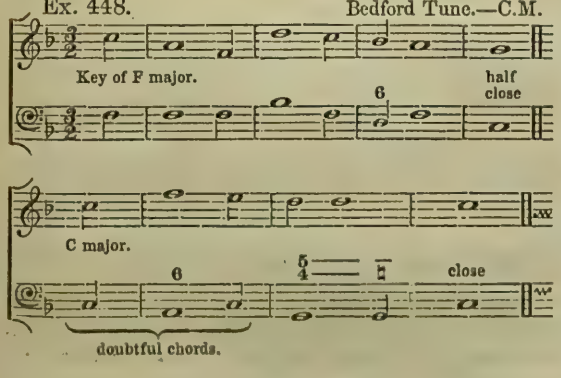
Ex. 447.

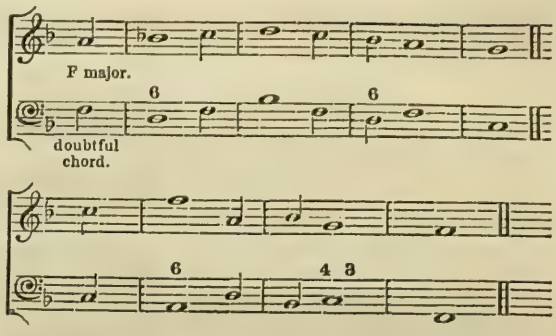


The Neapolitan sixth is also a doubtful chord.

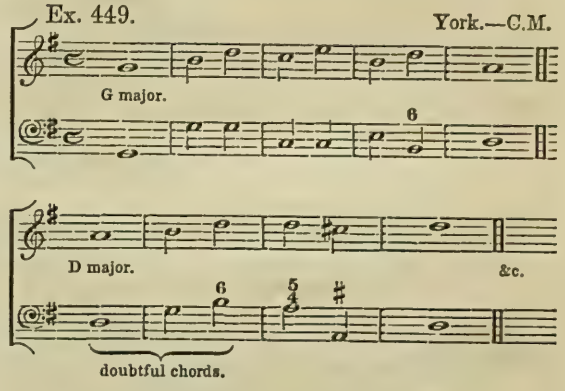
All doubtful chords are determined, in this work, by the succeeding chords which are not doubtful; especially in music composed in time, when the change of key is supposed to take place as soon as possible after the preceding cadence. See the following examples, where the chords which are doubtful are noticed :—

Ex. 448. Bedford Tune.—C.M.

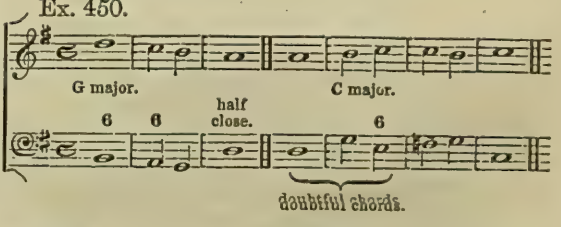




Ex. 449. York.—C.M.

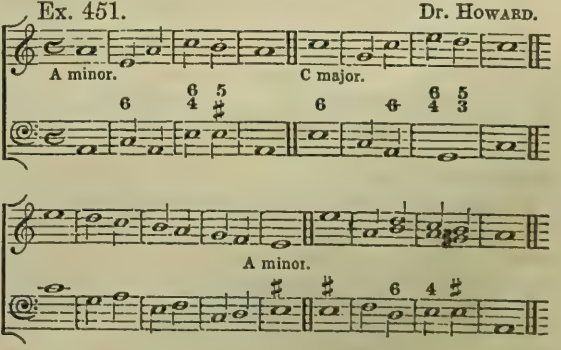


Ex. 450.



2nd. Sudden modulation means such as passes from one key to another by chords which are not doubtful, but decidedly in another key, as in the psalm tune, by Dr. Howard, called St. Bride's.

Ex. 451. Dr. Howard.



In modulation it will be advisable for the composer to be guided in his choice of the first chord of the new key by the rules of the diatonic succession. Thus, after a close in the major key of C, if the composer wishes to go into E minor, he should consider whether *Do*, *Fa*, or *Sol*, of E minor, would be

the best chord to begin with, *viz.*, whether it would be better to go—

Ex. 452.

From the triad of C to that of E, *Do*, rising a 3rd :—



Ex. 453.

From the triad of C to that of A, *Fa*, falling a 3rd :—



Ex. 454.

Or from the triad of C to that of B, *Sol*, falling a 2nd :—



And he would prefer *Fa*, falling a third, from the rules given, page 17.

Order and Duration of Modulation.

The order of modulation from a major key is usually,—

1st. Into the dominant;
2ndly. Into the subdominant;
3rdly. Into the relative;
4thly. Into the subdominant of the relative;
5thly. Into the dominant of the relative.

After any or all of these, a return may be made to the original key, at the option of the composer.

From a minor key the modulations, in ancient music, were the same as from a major key. But in modern music the order is sometimes as follows :—

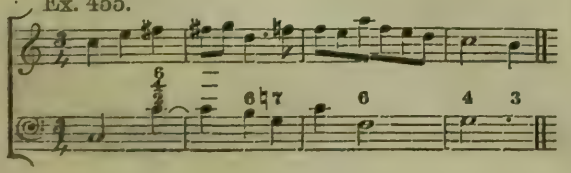
1st. Into the relative major key;
2ndly. Into the subdominant of the original key;
3rdly. Into the dominant;
4thly. Into the subdominant of the relative;
5thly. Into the dominant of the relative.

But the modulation of modern music is scarcely subject to any rule.

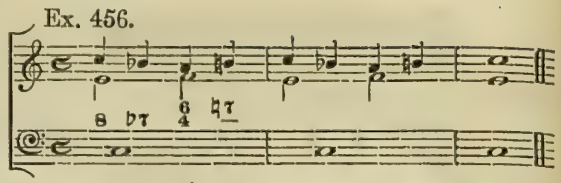
The duration of each key, in general, corresponds, in some measure, with the order of modulation. A piece of music remains some considerable time in the original key at its commencement and conclusion; and, as a return to it may be made after each or any of the modulations, it, of course, occupies more of the composition than any of the other keys. The key into which the first modulation is made, is generally next in duration, and the other keys take up a comparatively short portion of the composition.

Transient modulation is such, whether diatonic or chromatic, as is of very short duration; as in the following examples :—

Ex. 455.



Ex. 456.



The keys of which the various movements of an Oratorio, Opera, Sonata, Concerto, or other long composition consist, should, in general, be related to each other; or, in other words, the change of key from one movement to another should be natural, excepting where an effect is to be produced, corresponding with the change of scene, or for the sake of contrast. In modern music, however, this connexion is frequently disregarded.

Modulation by discords of Syncopation.

In discords of Syncopation, as,—

Ex. 457.



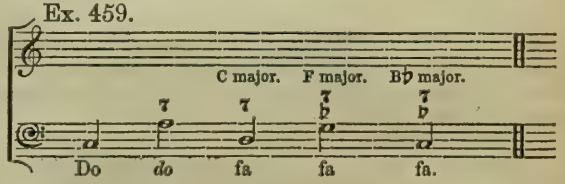
after the discord of Fa, inverted as a seventh, fifth, and third on Re, the bass may fall a fifth to Re, in the key of the subdominant with a seventh, fifth, and third :—

Ex. 458.

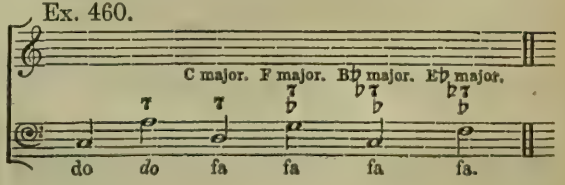


and this may again fall a fifth, &c., as often as the composer pleases :—

Ex. 459.



Ex. 460.



Modulation by a succession of Dominant Sevenths.

The dominant seventh may be resolved by the bass note Sol falling a perfect fifth to another dominant seventh, and so on as long as the composer pleases.

In accompanying this, the leading note (instead of rising) must fall one semitone to the next discordant note :—

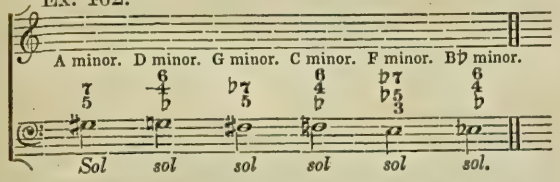
Ex. 461.



Modulation by a succession of Diminished Sevenths.

The leading note, when accompanied by a diminished seventh, may (instead of rising) fall a semitone, and be accompanied with a sixth, sharp fourth, and flat third (*viz.*, an inversion of a leading seventh), and so on alternately, as,—

Ex. 462.

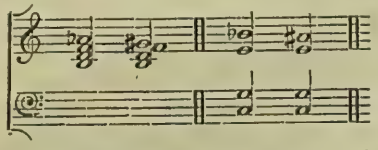


The diminished seventh may be either on the leading note, or on Fa sharp. See Chromatic Discords.

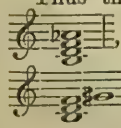
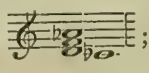
This passage sometimes rises instead of falling a semitone.

III. Enharmonic modulation signifies either, 1st, the passing from one discord to another of the same sound, on a keyed instrument, but expressed by different notes in writing :—

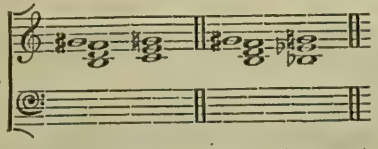
Ex. 463.



Or rather, 2ndly, The resolution of a discord as if it consisted of other notes, which produce the same sound on keyed instruments.

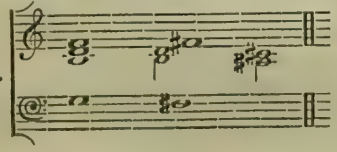
Thus the diminished seventh in the key of C,  , may be resolved as if it consisted of , or  ; as,—

Ex. 464.



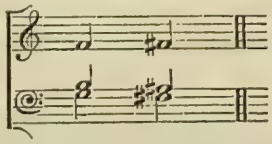
Thus the dominant seventh may be resolved as if it were the German sixth :—

Ex. 465.



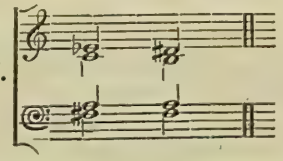
The seventh and third on Sol as if it were the Italian sixth :—

Ex. 466.



And the diminished seventh on Fa sharp, as if it were an inversion of the diminished seventh on *Re.*

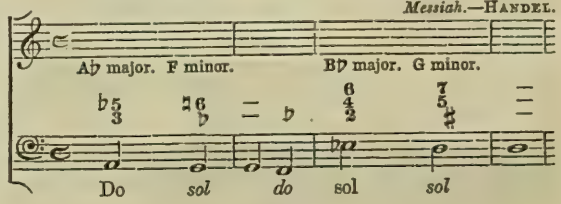
Ex. 467.



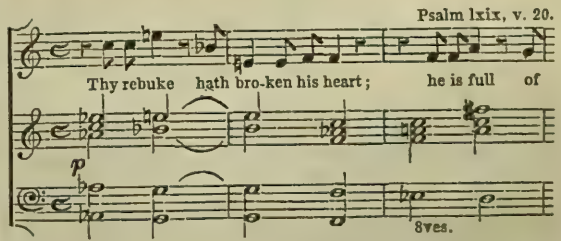
Examples of Enharmonic Modulation will be found in the Recitatives, "Thy Rebuke," in the *Messiah;* "My genial spirits droop," *Samson;* the second part of the air, "Return, O God of Hosts," *Samson;* and the conclusion of the chorus, "The Heavens are telling," in Haydn's *Creation:* the derivation of which is given before each.

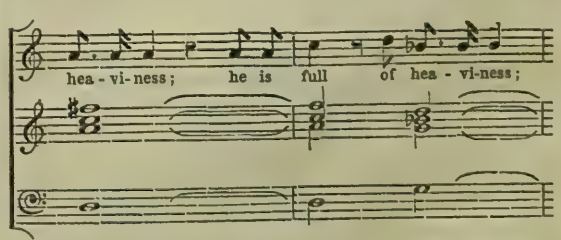
Ex. 468.

Harmony of part of the Recit : of "Thy rebuke."
Messiah.—HANDEL.

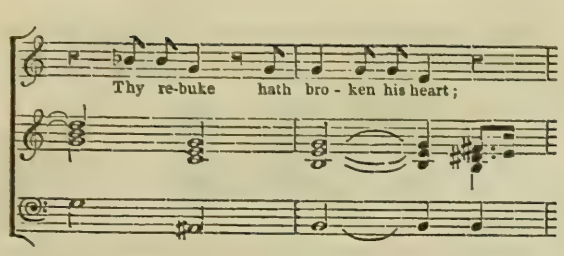






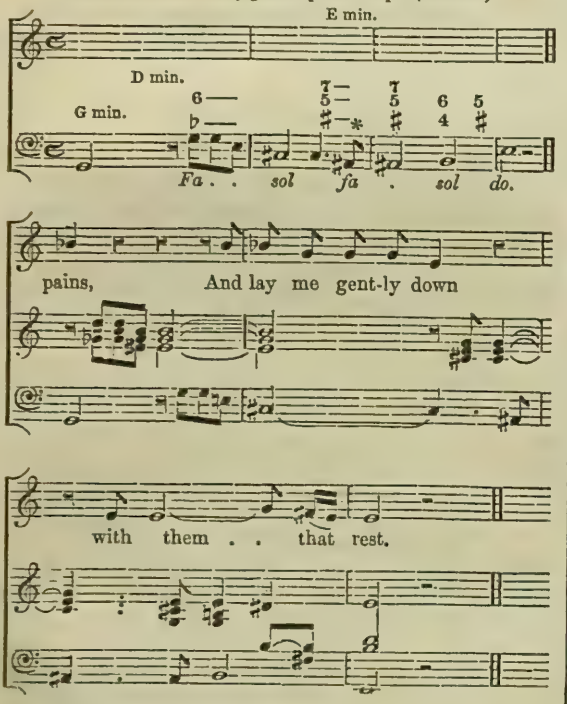


* This is an enharmonic modulation. The A♯ is used instead of B♭.



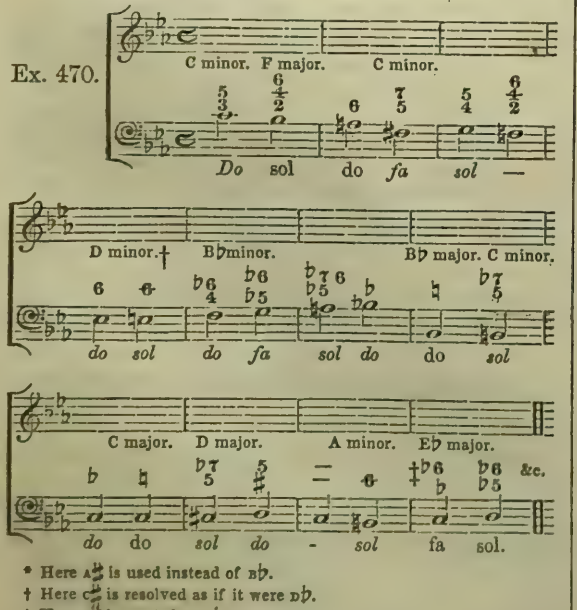
Ex. 469.

The last 4 bars of "My genial spirits droop." *(Samson.)*

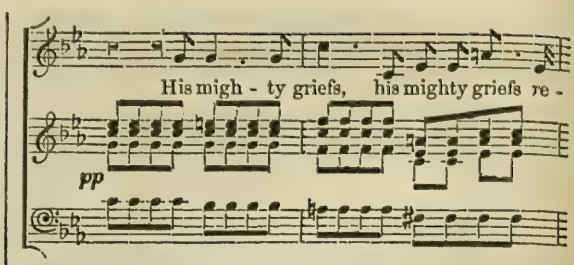


Extract from the 2nd part of "Return O God of Hosts."

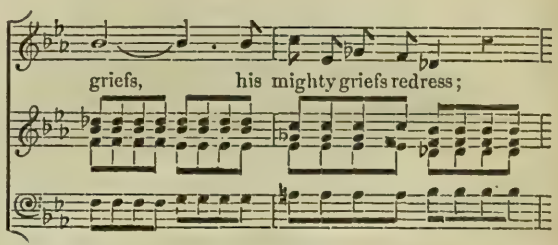
Ex. 470.

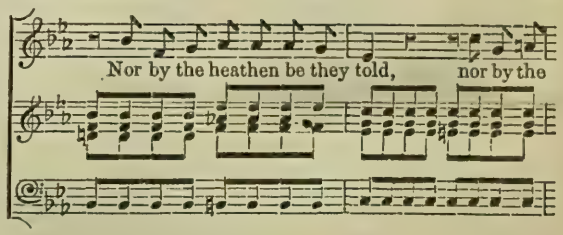


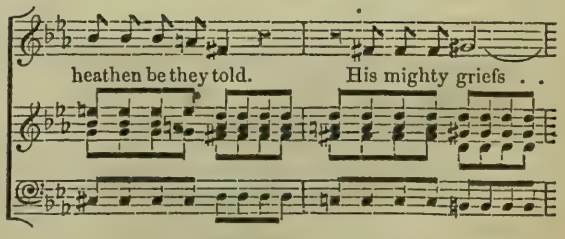
* Here A♯ is used instead of B♭.
† Here C♯ is resolved as if it were D♭.
‡ Here G♯ is treated as A♭.

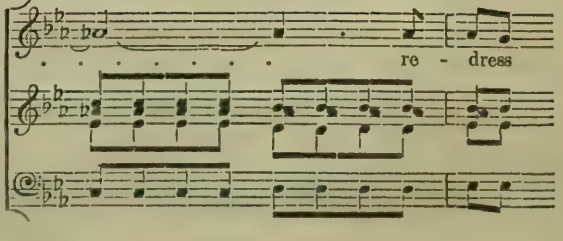












Ex. 471. From Haydn's *Création*.



The student is particularly recommended, before he proceeds further, to make himself well acquainted with all the preceding part of this work; examining for himself the works of good composers; and adopting whatever he admires in their method of treating discords and modulation.

CHAPTER VII.

Of Canon, Fugue, and Imitation.

A CANON is a melody performed by two or more parts of a score at the same time,‡ subject to all the foregoing rules of harmony and music in real parts.

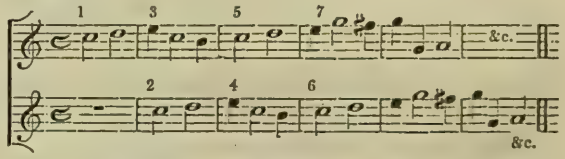
Canons are either 2 in 1, *viz.*, two parts performing the same melody.§

Or, 3 parts in 1 melody.
4, 5, 6, or any number
in 1 .....
4 in 2 melodies.
5 in 2, *viz.*, 3 in 1 and 2 in the other.
6 in 2 melodies.
7 in 2, *viz.*, 4 in 1 and 3 in the other.
8 in 2 .....
6 in 3 .....
8 in 4 ..... &c., &c.

The principal melody (or that which begins) is called the subject; the others are called the answers: these may begin on the unison (*viz.*, on the same note with which the subject began); on the octave or fifteenth above or below the note with which the subject began; on the fourth or eleventh, above or below; on the fifth or twelfth, above or below; or on any other note which the composer may choose: but the above-mentioned canons are recommended as most easy of construction. These particulars are generally specified at the beginning of the canon. Thus a canon, two in one, on the unison, signifies that two parts perform the same melody, both beginning on the same note; three in one on the fifth and eighth above, means that three parts perform one melody, the answers beginning respectively a fifth, and an octave, above the first note of the subject.

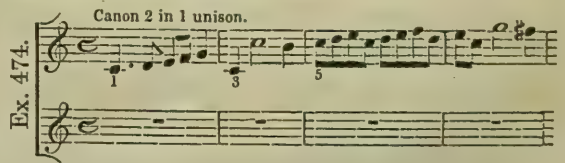
Canon, two in one on the unison :‖—

Ex. 473.



In making this, and all other canons, the composer, after writing as much of the subject as exists before the answer begins, suppose one bar, marked (1), is to transcribe it, before he goes any further, into the answer marked (2); then he may compose a similar portion, as the bar marked (3), making it a good accompaniment to bar (2); then transcribe it to bar (4); then add (5), (6), (7), &c., &c. The length of this portion, or distance, at which the answer is made, is at the option of the composer. If very distant, the canon is so extremely easy of construction as to possess little merit :—

Ex. 474.



* c♯ used for d♭, and d♭ resolved as if it were a♯.

† a♯ resolved as d♭.

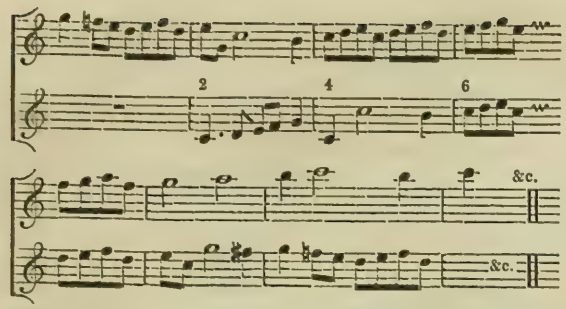
‡ *Viz.*, one part must begin before the other has concluded.

§ A canon originally signified a kind of musical puzzle or enigma. In a canon of two in one, or more in one, only one line was written, and the student, by way of musical exercise, was to discover the method of performing, or, as it is called, of solving, the canon. In a canon of four in two, six in two, or eight in two, only two lines were written, &c.

Ex. 472.

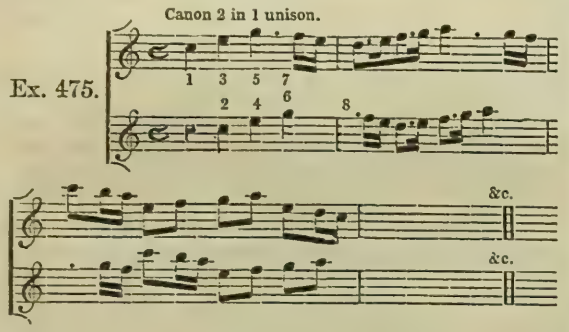


‖ This and many other canons marked &c., at the end, are purposely left unfinished, that the student may complete them.



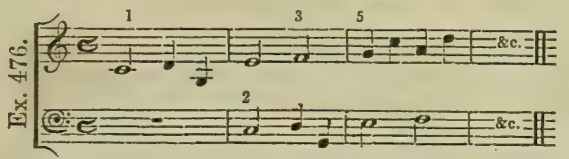
and if too near, the subject will not be distinguished by the ear, before its answer commences :—

Ex. 475.



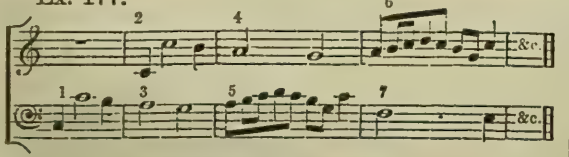
Canon 2 in 1 on the 8ve below :—

Ex. 476.



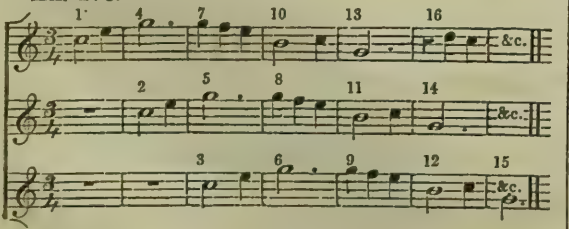
Canon 2 in 1 on the 8ve above :—

Ex. 477.



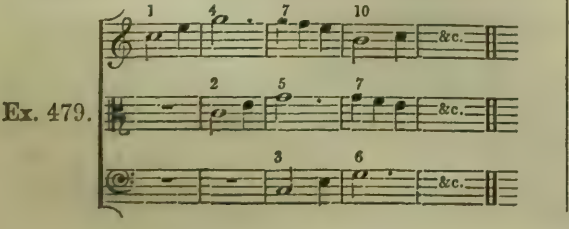
Canon 3 in 1 on the unison :—

Ex. 478.



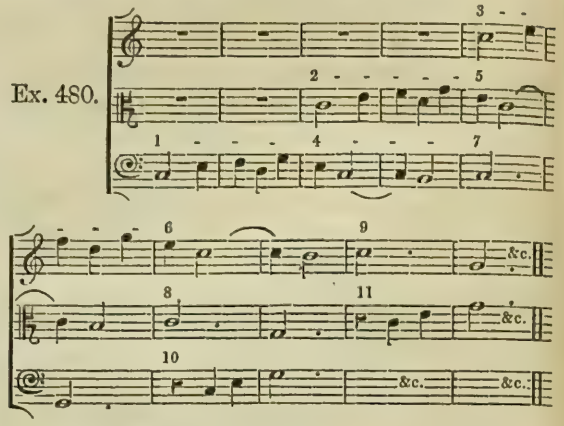
Canon 3 in 1 on the 8ve and 15th below :—

Ex. 479.



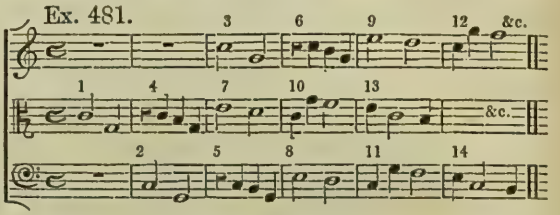
Canon 3 in 1 on the 8ve and 15th above :—

Ex. 480.



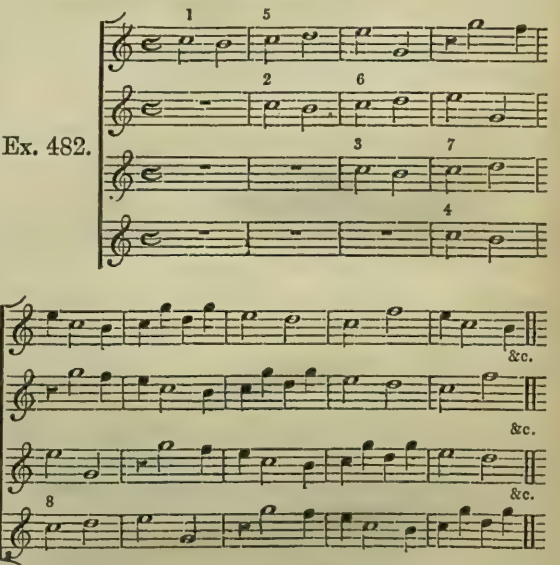
Canon 3 in 1 on the 8ve below and 8ve above :—

Ex. 481.



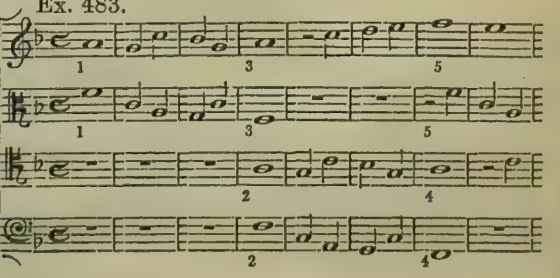
Canon 4 in 1 on the unison :—

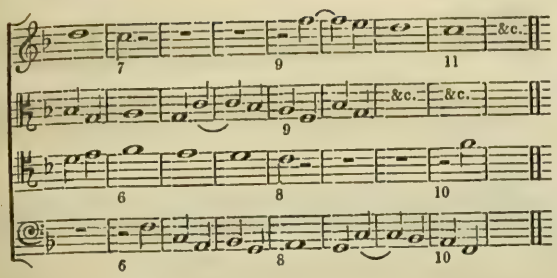
Ex. 482.



Canon 4 in 2 on the 8ve below; here are two subjects and two answers :—

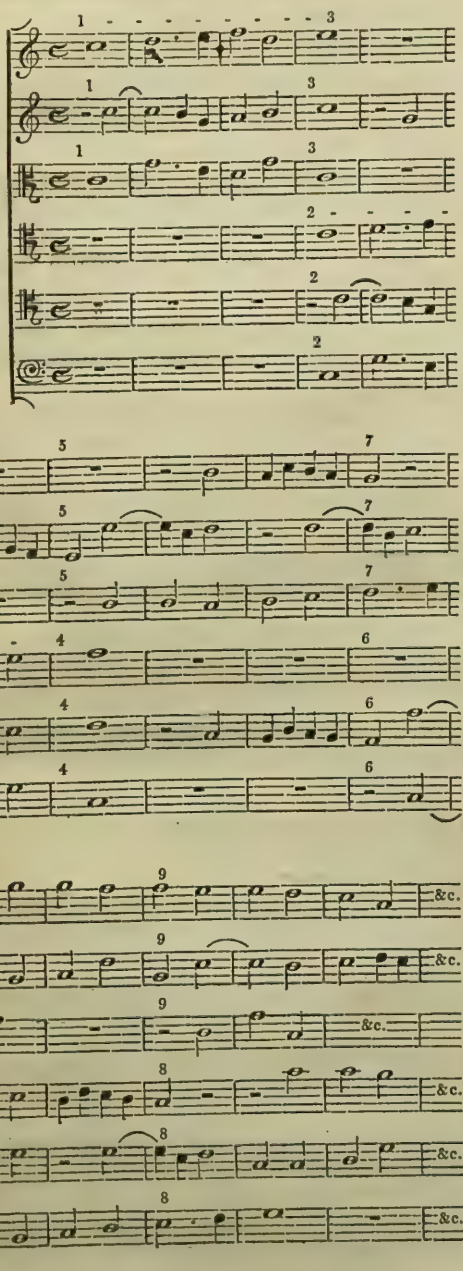
Ex. 483.





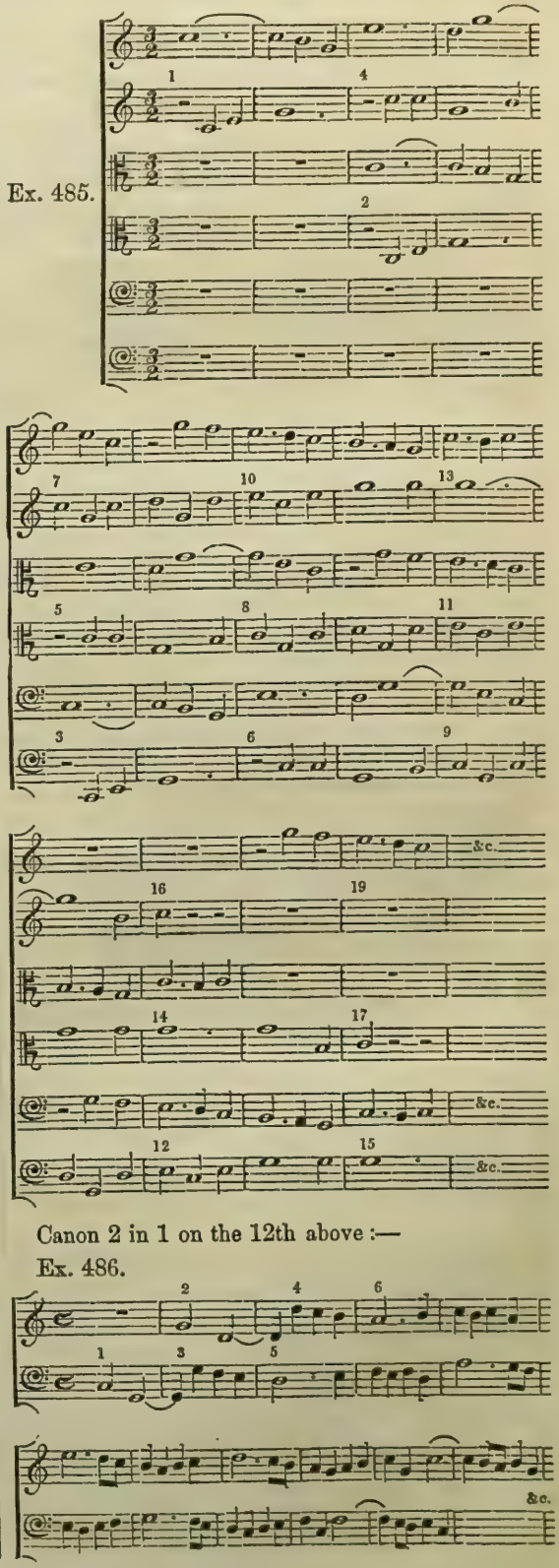
Canon 6 in 3 on the 8ve below, *viz.*, 3 subjects and 3 answers :—

Ex. 484.



Canon 6 in 2 on the 8ve and 15th below, *viz.*, 2 subjects and 4 answers :—

Ex. 485.

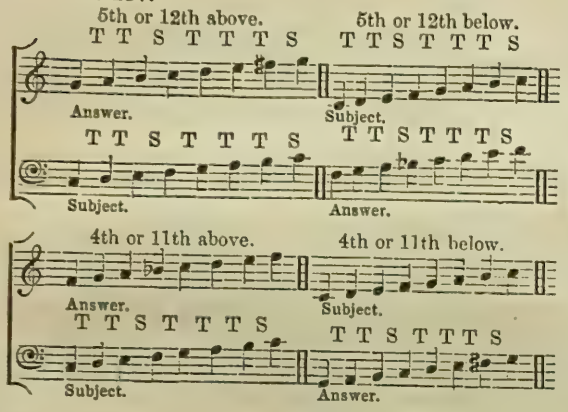


Canon 2 in 1 on the 12th above :—

Ex. 486.

Previously to the composition of a canon, in which the answer is to be on the fifth, twelfth, fourth, or eleventh, above or below, in which there is to be no modulation, the student is recommended to write the scales of each part, one over the other, the intervals being exactly the same in each, as in the following example :—

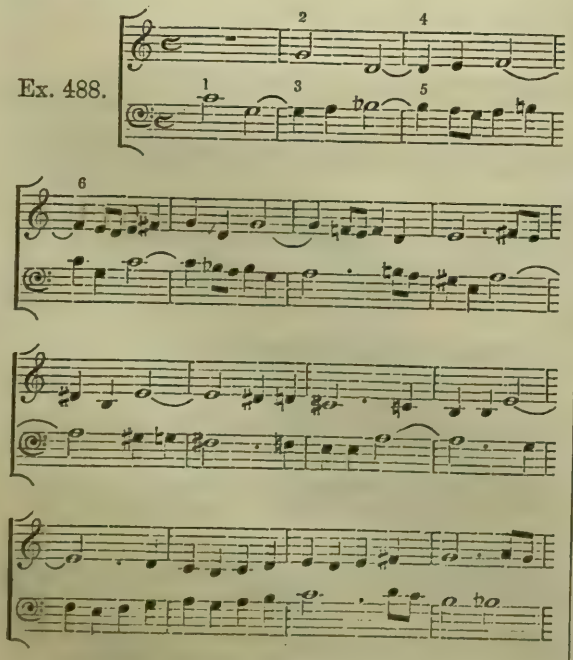
Ex. 487.

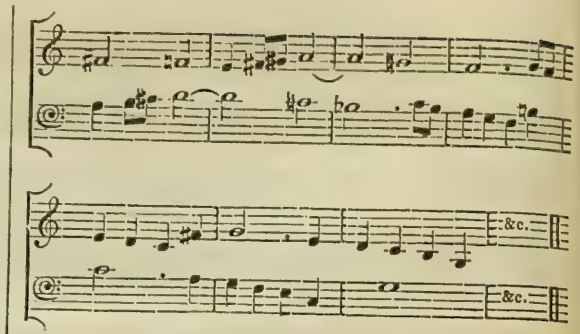


and observe which note of the subject will cause an alteration of flats and sharps in the answer, in order that it may be avoided. Thus, if the canon is to be on the fifth or twelfth above, or the fourth or eleventh below, the seventh note of the key should be avoided in the subject, because it produces an accidental sharp in the answer: and if the canon be in the fifth or twelfth below, or the fourth or eleventh above, the fourth note of the subject is to be avoided, because it will produce an accidental flat in the answer. But if the composer wishes to modulate, he may use these or any other notes.

Canon two in one, on the fifth above, with modulation :—

Ex. 488.





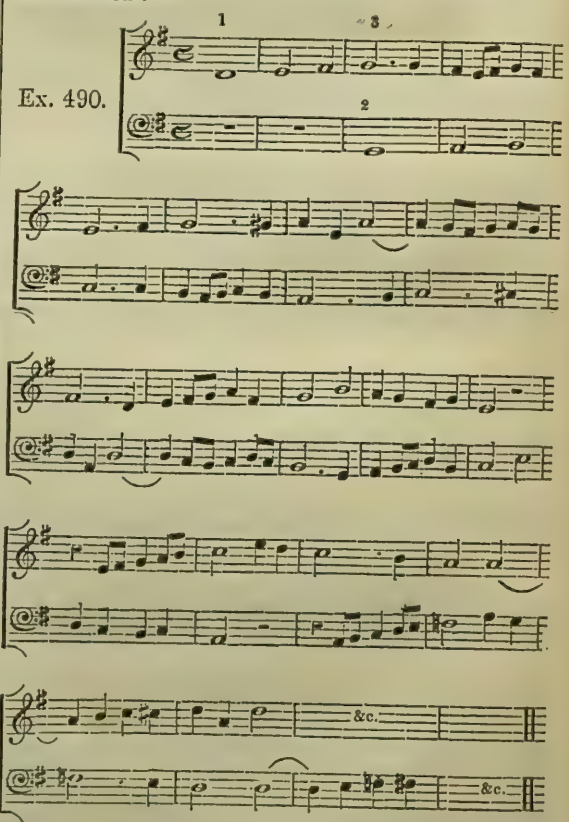
Canon two in one, on the fifth below, without any modulation :—

Ex. 489.



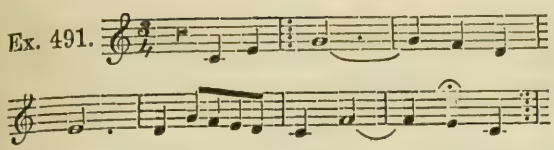
Canon two in one, on the twelfth below, with modulation :—

Ex. 490.



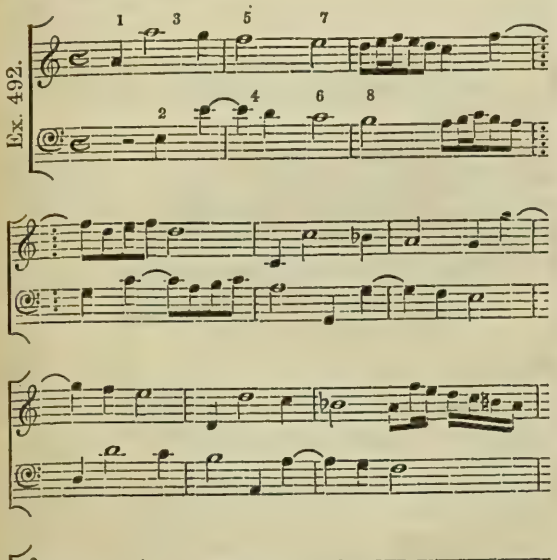
A perpetual canon is one in which a certain number of bars are marked to be repeated as often as the performers choose (which is usually three times), and then the canon is concluded, either by a pause over one of the notes, as,—

Ex. 491.



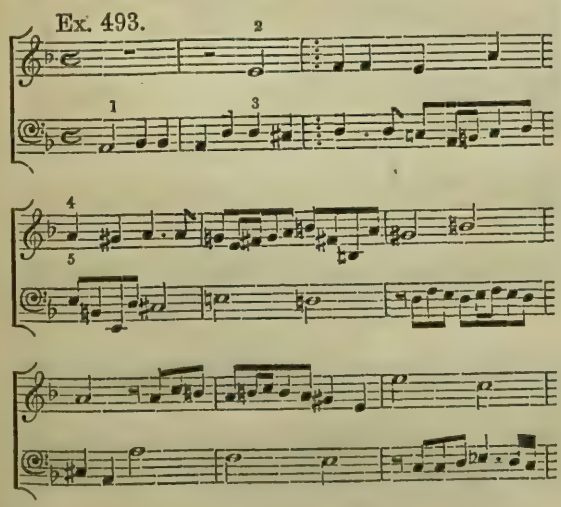
by a double bar, as,—

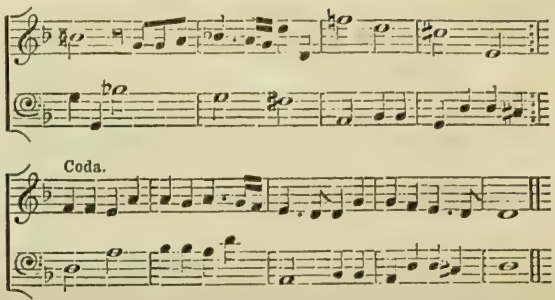
Ex. 492.



or by a coda, *viz.*, a few bars, either in canon or not, as the composer pleases, as,—

Ex. 493.





Coda.

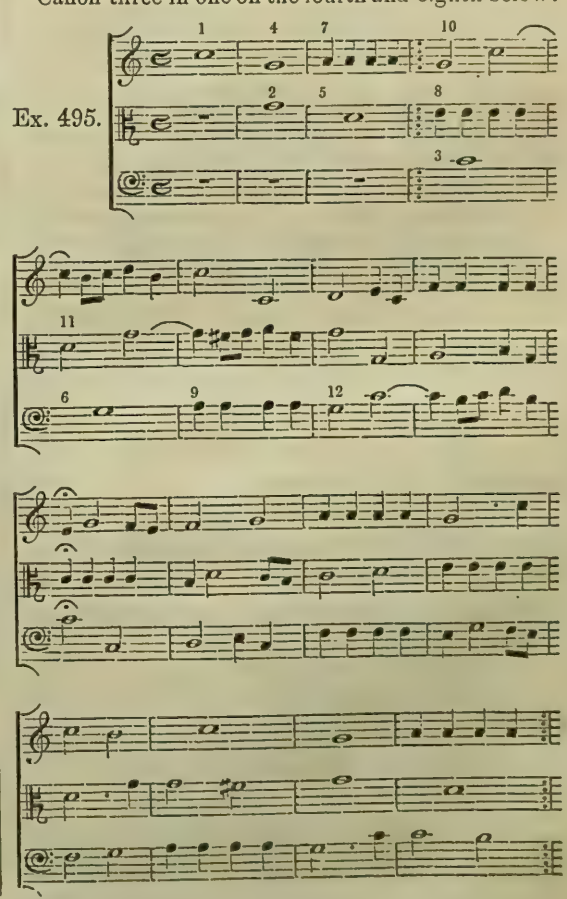
A canon which is not perpetual usually terminates with a few bars or notes not in canon, as,—

Ex. 494.



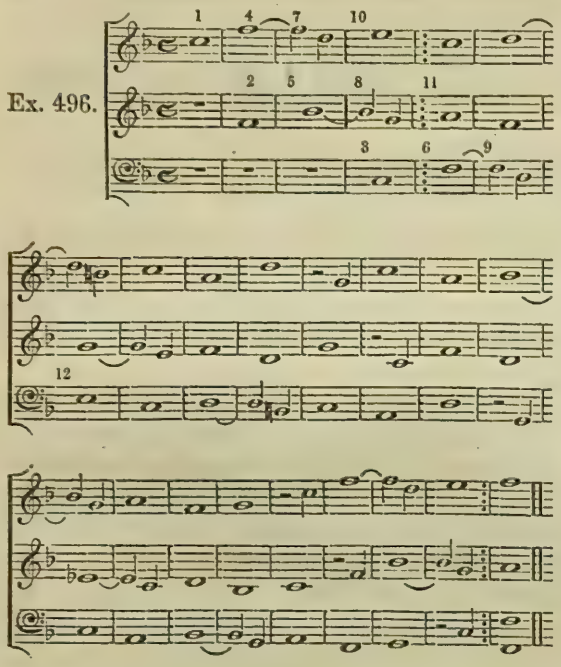
Canon three in one on the fourth and eighth below:

Ex. 495.



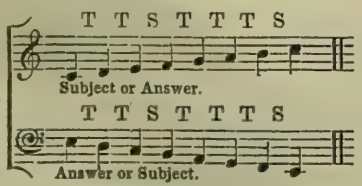
Canon three in one on the fifth and fifteenth below:

Ex. 496.



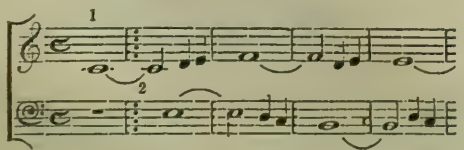
A canon by inversion* is one in which the answer consists of the same melody as the subject, but all the motion inverted. Where the subject ascends the answer is to descend, and *vice versâ*, the intervals remaining strict: *viz.*, if the subject ascends a major third, the answer must descend a major third; if the subject descends an imperfect fifth, the answer must ascend a similar interval, &c. Previous to the composition of this sort of canon, the student should make a scale, as before, of the subject and answer, the one ascending, the other descending by similar intervals, as in the following example, where it will be found that when the subject begins on the key note of the major key, an answer on the third or tenth above, or on the sixth or thirteenth below, will be the most easy to construct:—

Ex. 497.

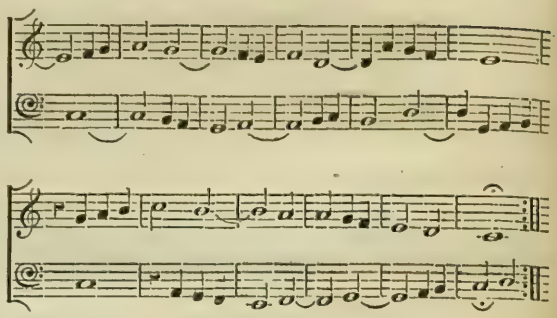


Canon two in one by inversion on the sixth below:—

Ex. 498.

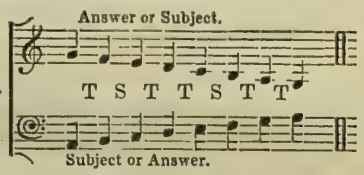


* This sort of canon has also been called *per arsin et thesin*; and, by the Italians, *moto contrario*. Inversion here relates to the motion of the notes, not to the position of the parts—as in an interval inverted, or a counterpoint inverted, where the bass becomes the treble, and the reverse.



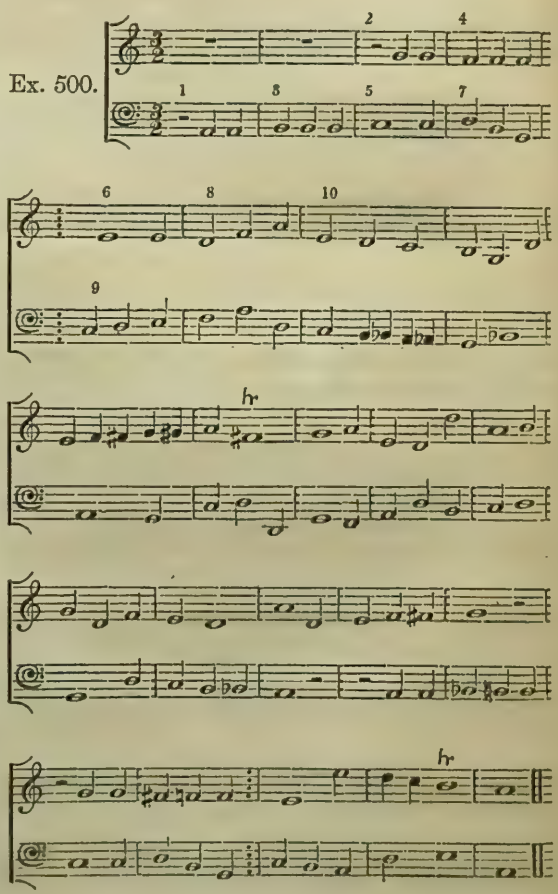
Another preparatory arrangement of scales, in which the subject may begin on the key note of the minor key, and the answer on the seventh or fourteenth above, or it might be on the second or ninth below, is subjoined:—

Ex. 499.



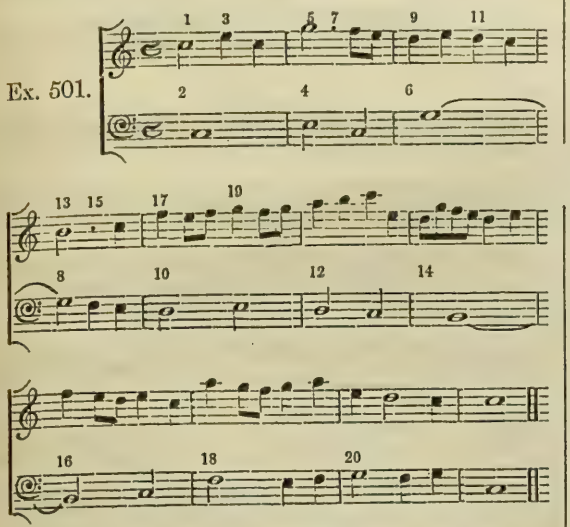
Canon two in one, by inversion on the fourteenth above:—

Ex. 500.



A canon by augmentation is one in which the notes of the answer are double the length of those in the subject. The answer may begin either with or after the subject. The next example is a canon, two in one, by augmentation, on the fifteenth below :—

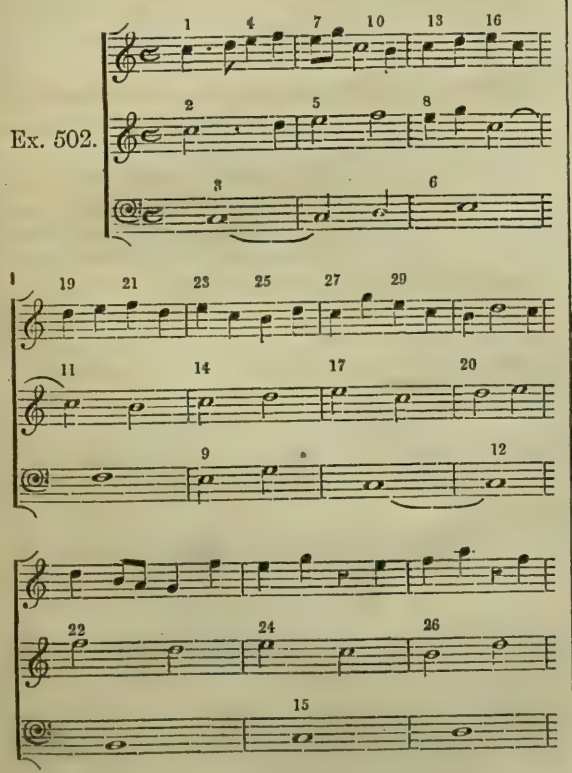
Ex. 501.



Double augmentation signifies that the notes of the second answer are twice the length of those of the first answer, and four times the length of those of the subject.

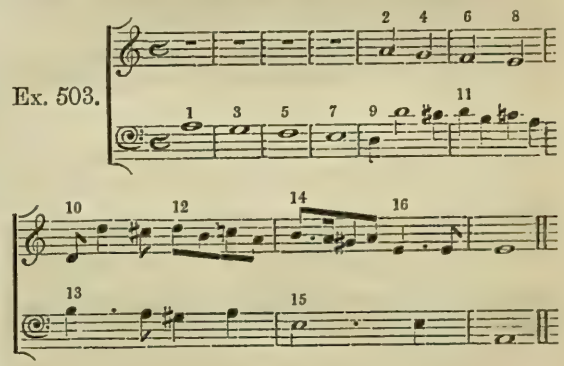
Canon, three in one, by augmentation and double augmentation, on the unison and fifteenth below :—

Ex. 502.



A canon by diminution signifies one in which the notes of the answer are half the length of those in the subject, as in the following, which is a canon two in one, by diminution, on the octave above :—

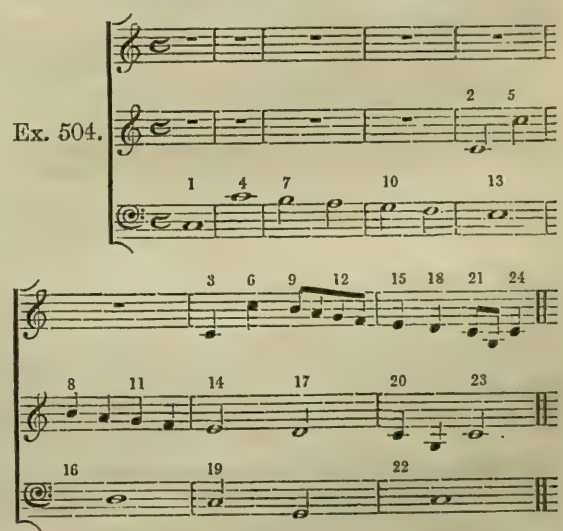
Ex. 503.



Double diminution signifies that the notes of the second answer are one quarter of the length of those in the subject.

Canon, three in one, by diminution and double diminution, on the octave above :—

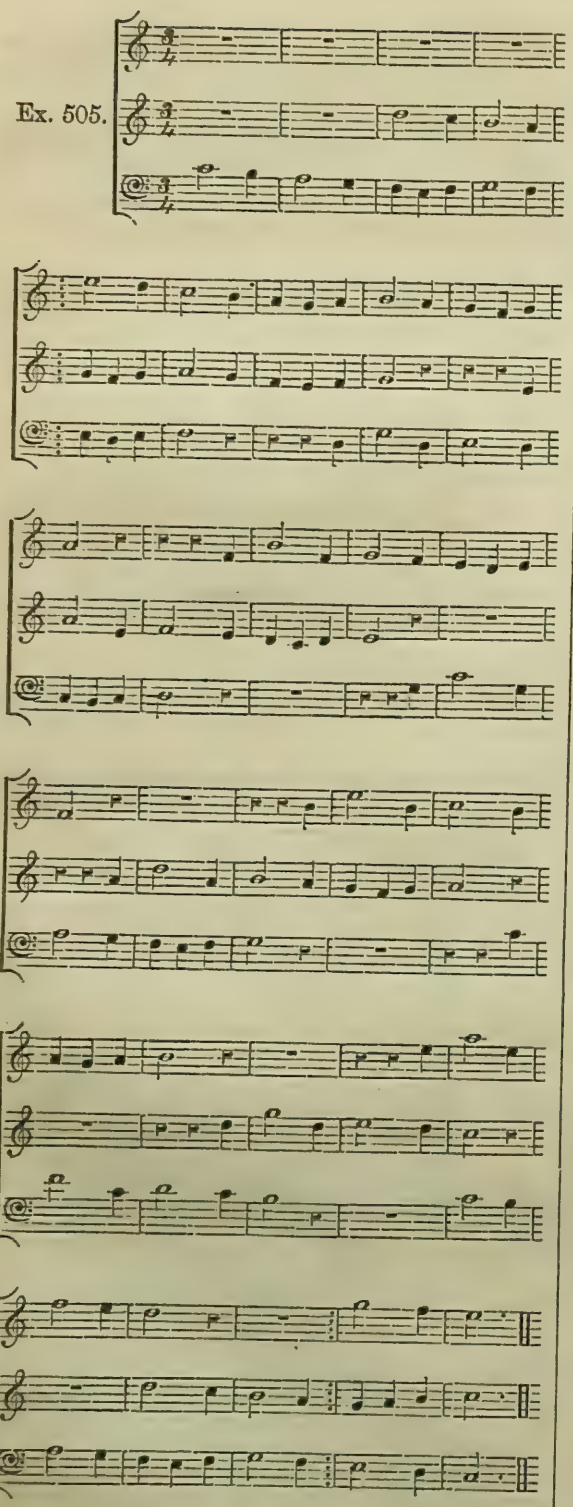
Ex. 504.



A canon in which the intervals are not exactly preserved in the answers, is not, in this work at least, considered as strict. In some pieces called canons, however, it has been thought sufficient that the answer should be in the same key.

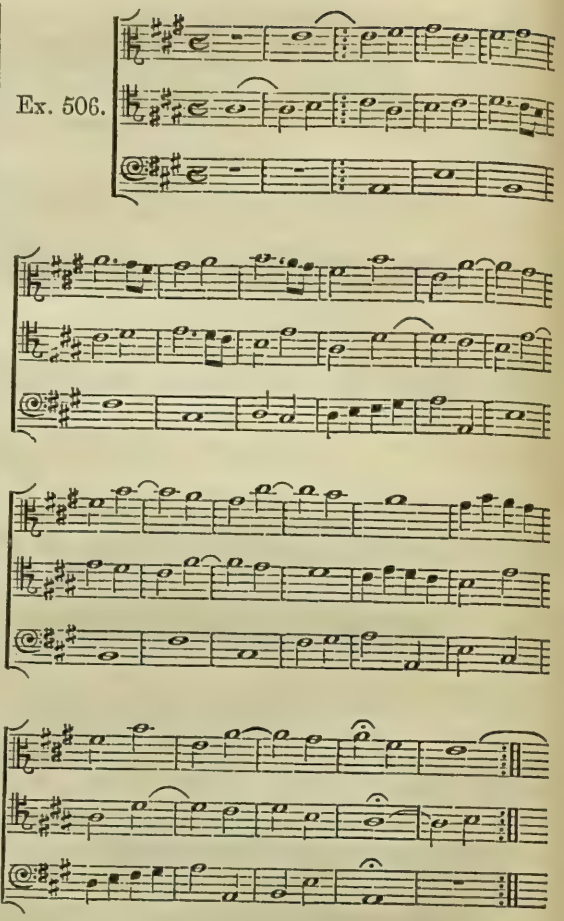
The following is a canon three in one, on the ninth and tenth above, the intervals not being regarded :—

Ex. 505.



A canon may have one or more parts of free accompaniment, *viz.*, not in canon, as in the next example, which is a canon two in one, on the fifth above, with a free bass :—

Ex. 506.

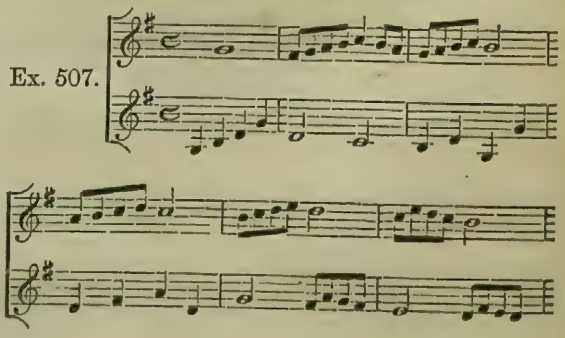


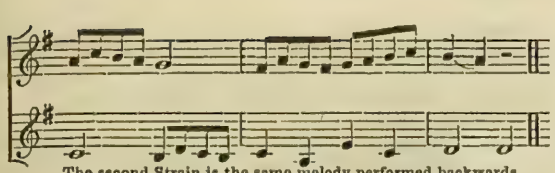
Passages in strict canon are frequently introduced in fugues, choruses, symphonies, quartetts, and all kinds of music.

Other pieces of music, besides those of the foregoing description, have obtained the name of canons; but they do not answer the definition adopted in this work, *viz.*, that a canon is "a melody performed by two or more parts of a score at the same time."

Such are melodies that are first played forward and afterwards backward. The melody in two parts in the following example, is to be first performed in the usual manner from left to right, and then from right to left, or *per recte et retro* :—

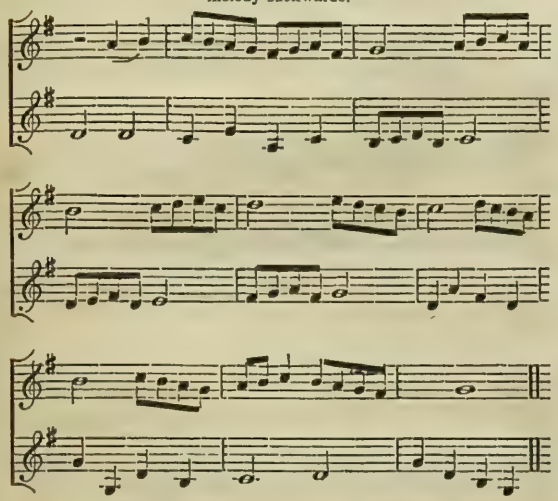
Ex. 507.





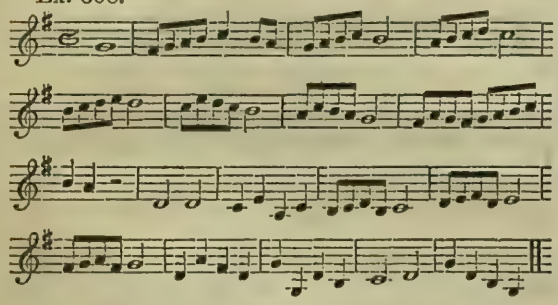
The second Strain is the same melody performed backwards.

Solution, or the 2nd Strain, obtained by performing the above melody backwards.



It is evident that this is not the same melody performed by two or more parts of a score at the same time; and, therefore, if written in such a manner as to appear like a canon, it will not, nevertheless, be deserving of the name: yet this sort of composition has been so written, by transferring the under part of the solution to the same line with the upper melody, thus :—

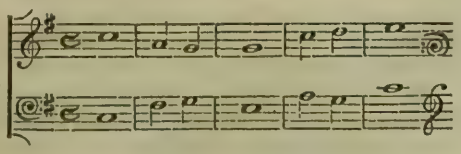
Ex. 508.



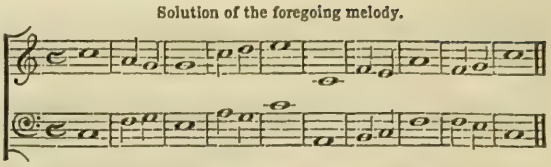
and it has then been called a canon two in one, *per recte et retro, viz.*, two parts in one line; the one reading from left to right, and the other, *at the same time*, from right to left.

A melody *alla rovescio* is one which is first performed in the usual way, and then with the paper inverted, as,—

Ex. 509.

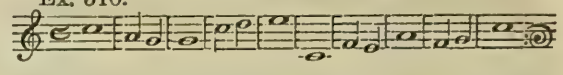


Solution of the foregoing melody.



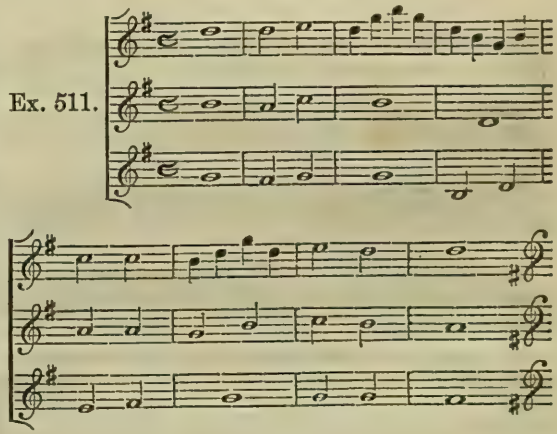
This evidently is not the same melody, performed by two or more parts of a score at the same time; yet this kind of composition also has been written in the form of a canon, as follows, and has been called canon two in one, *alla rovescio* :—

Ex. 510.

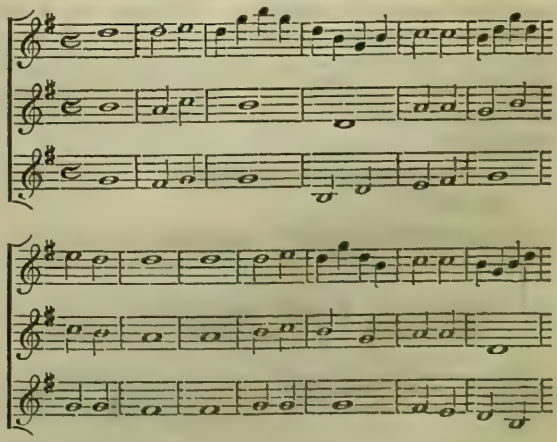


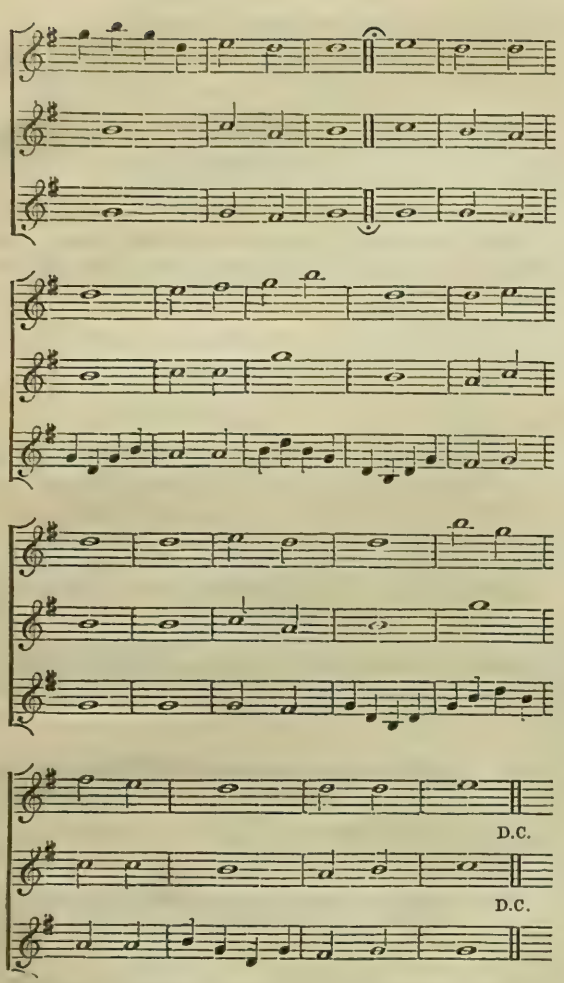
The name of canon has also been bestowed on such a melody as the next example, which is first to be performed in the usual way, from left to right, and then from right to left; then the paper is inverted, and the melody performed from left to right, and from right to left: this, however, not producing a full close, the paper must be returned to its former position, and the melody again performed from left to right, and from right to left; and this has been called a canon three in one, *per recte et retro*, and *alla rovescio* :—

Ex. 511.



Solution of the foregoing melody.



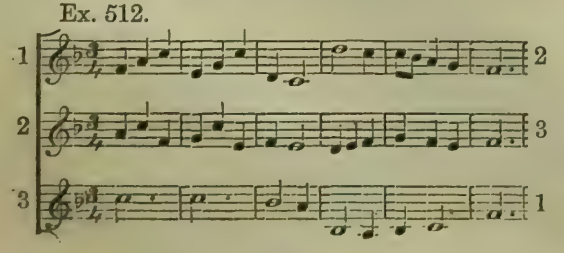


Rounds, also, or catches, have been written in the form of canons, and called such, particularly by the modern Italians.

A Round is a vocal composition in three or more parts, all written in the same clef, the performers of which are to sing each part in succession, as is indicated by the figures at the beginning and end of each line, *viz.*, the first voice is to sing the first, second, and third parts in succession, and then the first again, &c. The second voice is to begin the first line when the first voice begins the second; and when the first voice begins the third line, the third voice is to begin the first line, and the second voice the second line.

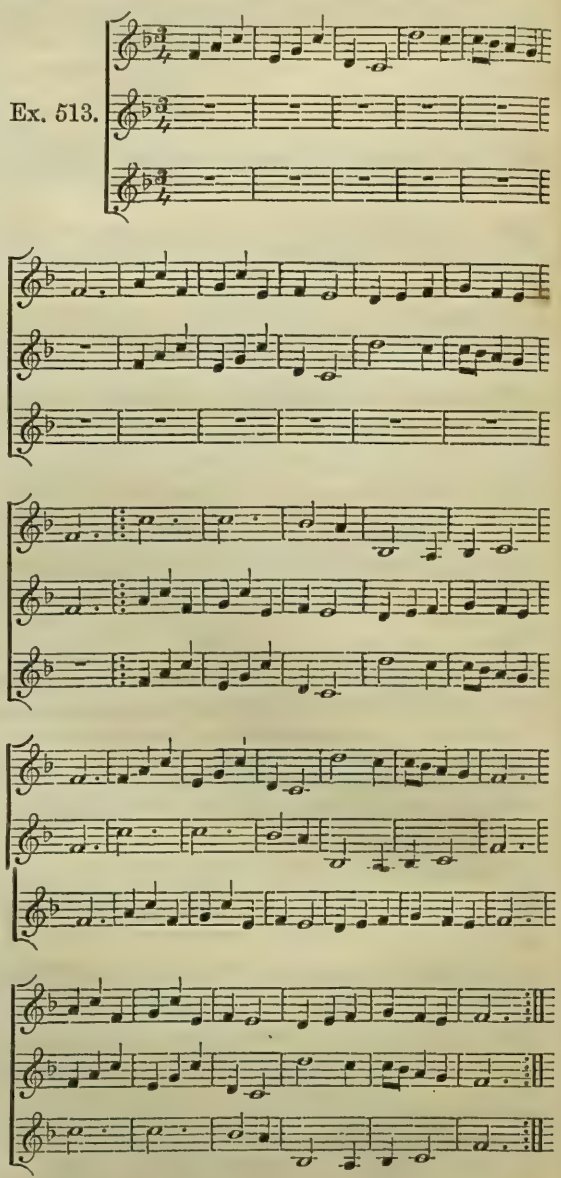
Round for three voices.

Ex. 512.



That this does not answer the definition of a canon is obvious; yet it is frequently made to resemble a canon in unison, by writing it at length, as,—

Ex. 513.



Rounds are also written in the form of canons, the voices answering in octaves instead of unisons. Still these are only rounds in disguise.

Of Fugue.

A strict Fugue is a composition in which a subject, given out by one of the parts in the authentic mode, is answered in the plagal, and *vice versâ*. All fugues, in which this rule is not observed, will, in this work, be considered as free, *viz.*, not strict fugues.

The authentic mode is that part of the key contained between the key note, Do, and its fifth above, Sol; and the plagal mode is the remaining part,

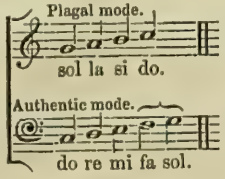
contained between Sol and the key note, Do, above Sol. Thus the authentic mode consists of five notes, and the plagal of four.

The above is said to have originated in the Chants of the old Christian church.

In the commencement of a strict fugue, the extreme notes Do and Sol of the authentic mode are to be respectively answered by the extreme notes Sol and Do of the plagal, and *vice versâ*, the intermediate notes not being liable to any rule.

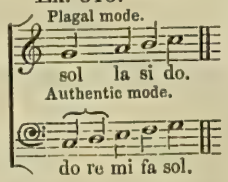
Ex. 514.

Thus Do is answered by Sol,
Re ..... by La,
Mi ..... by Si,
Fa and Sol... by Do.



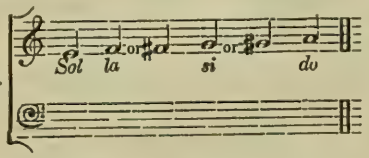
Ex. 515.

Or, Do and Re... by Sol,
Mi ..... by La,
Fa ..... by Si,
And Sol ..... by Do.



In the minor key, *La* and *Si* in the plagal modes may occasionally be raised a semitone :—

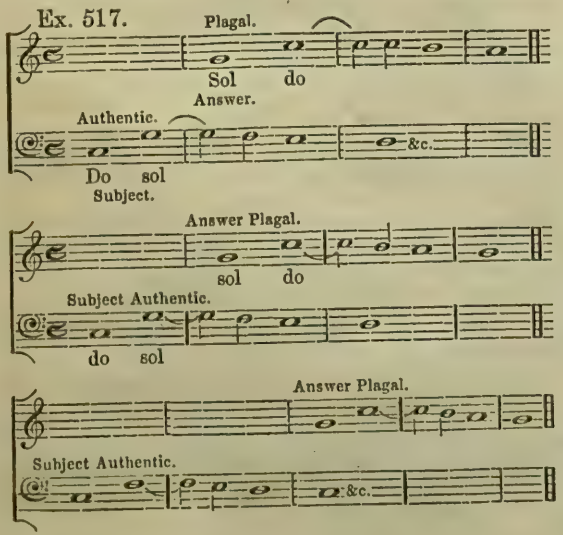
Ex. 516.

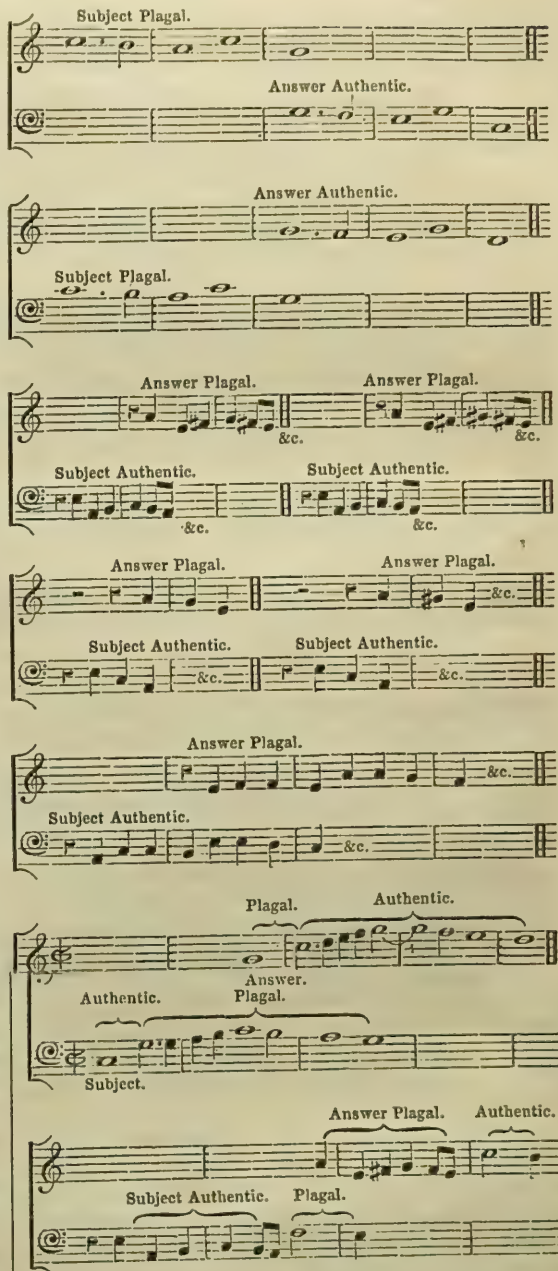


In a strict fugue every subject begins either with Do or Sol.

The following example contains a variety of subjects with their answers. In general, however, it is sufficient that the above rules be attended to in the two first notes of the subject, and the rest of the answer may be considered as in the dominant key, like the answer of a canon on the fifth above, or fourth below :—

Ex. 517.

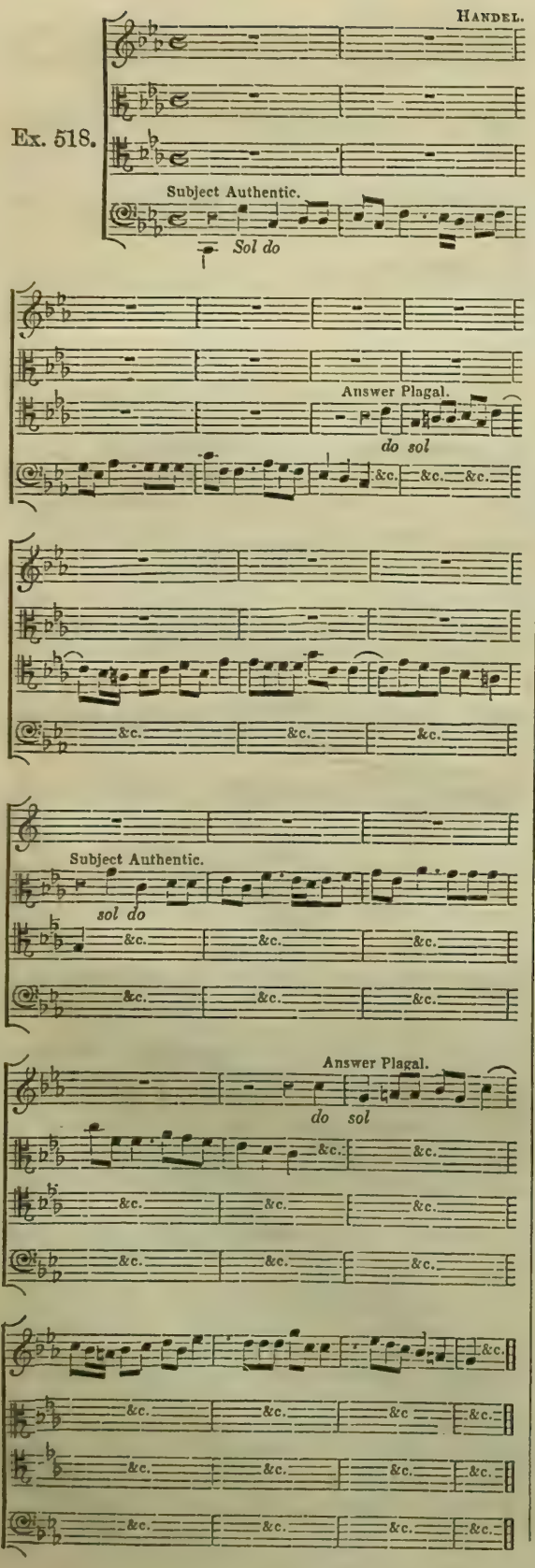




In a strict fugue the subject is given out by one of the parts, then the answer is made by another; and afterwards the subject is repeated by a third part; and if the fugue consists of four parts, the answer is again made by the fourth part; after which, the composer may use either the subject or the answer, or small portions of them, in any key he pleases, or even on different notes of the key.

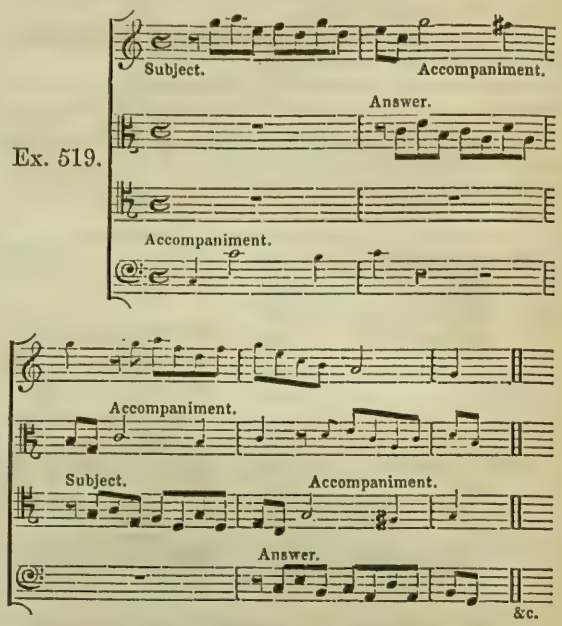
In the next example, the empty bars marked thus (&c.), contain any free accompaniment the composer pleases; but, of course, the more it resembles the style of the subject the better, unless intended for contrast :—

Ex. 518.

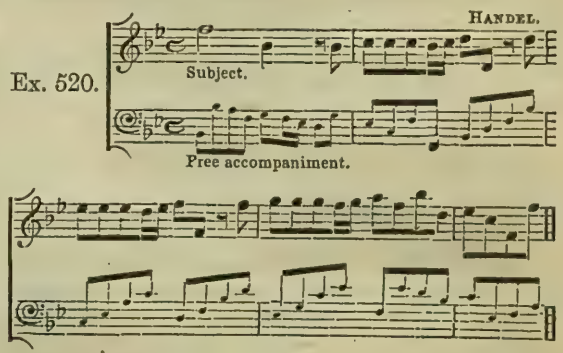


In the subjoined examples, this sort of accompaniment is inserted in little notes :—

Ex. 519.

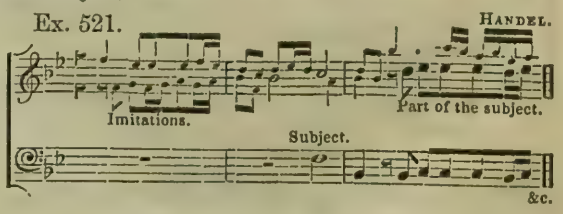


Ex. 520.



Between the subjects, or between the subjects and the answers, and *vice versâ*, some passage, perhaps not necessarily resembling the subject, may be used to assist the modulation and introduce a return of the subject, thus :—

Ex. 521.

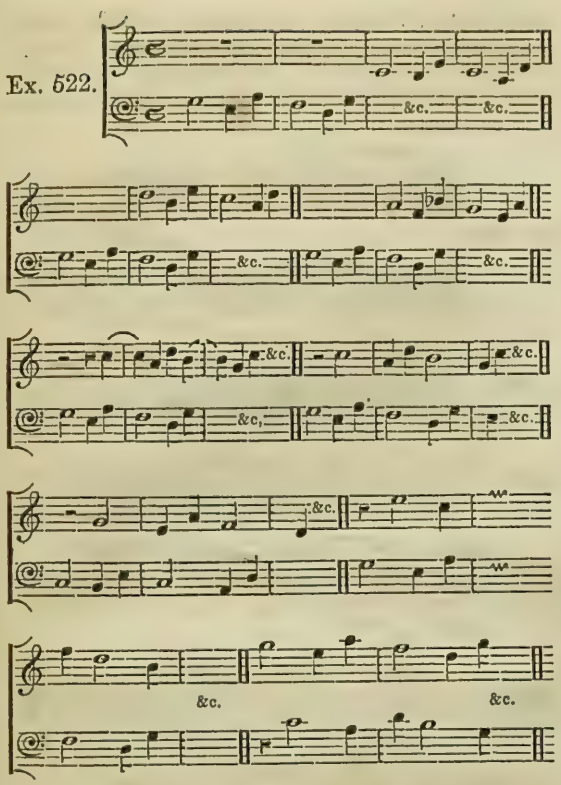


The answers and subjects of a fugue should become more close and frequent *(piu stretto)* towards its conclusion.

A subject which can only be performed by one part at a time is unfit for a fugue, rendering it tedious and uninteresting.

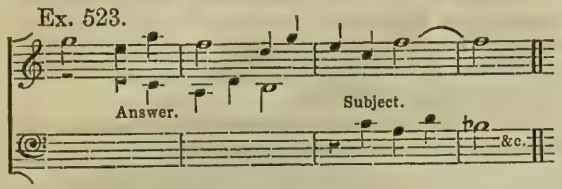
The next example is a subject with its answers and repetitions, at various distances of time, and on various notes of the key :—

Ex. 522.

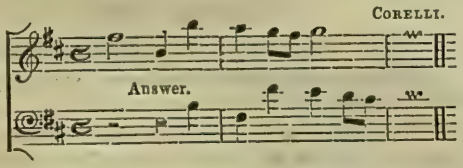


The first note of the subject or answer is frequently shortened or lengthened in the course of the fugue, as in the following examples :—

Ex. 523.



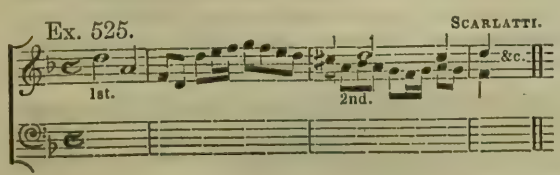
Ex. 524.



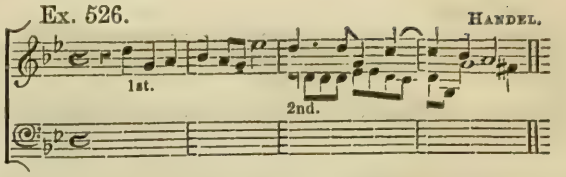
A double fugue is one in which there are two or more subjects, some two of which, at least, are used together in the course of the fugue.

The subjects may either begin nearly together, at the beginning of the fugue, as in the subjoined examples, where they are distinguished by the figures 1st and 2nd :—

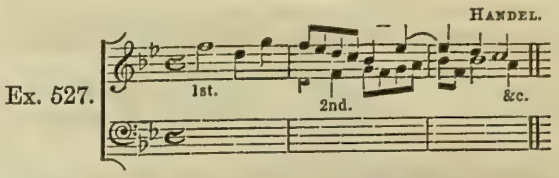
Ex. 525.



Ex. 526.

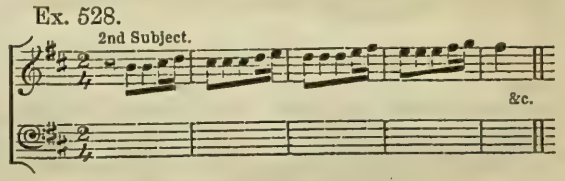


Ex. 527.



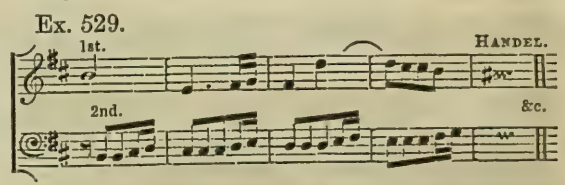
or the second subject may be introduced in the middle, or towards the latter end of the fugue; either by itself, as,—

Ex. 528.



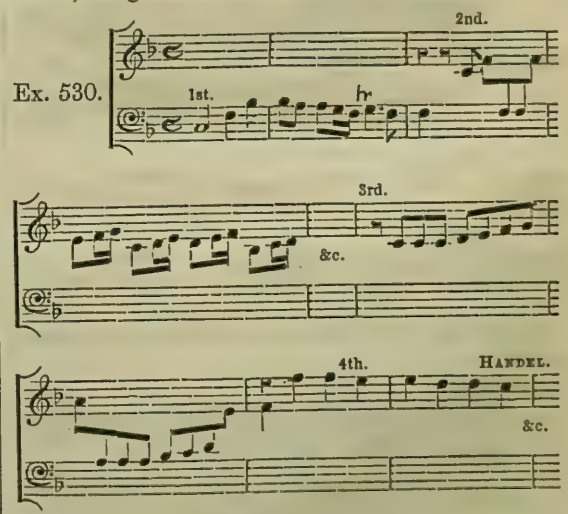
or together with the first subject, as,—

Ex. 529.



The four subjects of the chorus, "Let old Timotheus yield the prize," in Handel's *Alexander's Feast*, are given in the following example :—

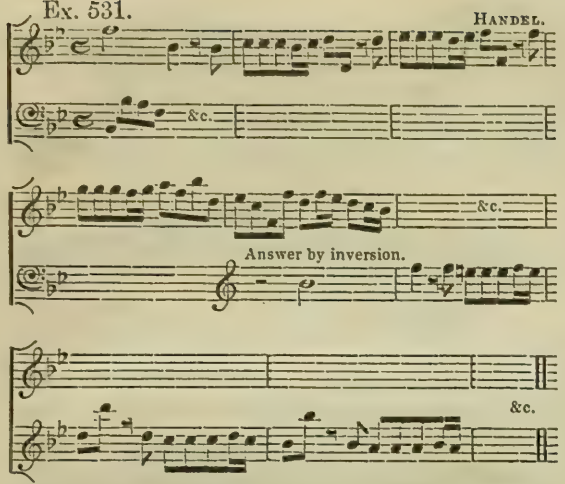
Ex. 530.



The subject of a fugue is sometimes answered in inversion, reversion, diminution, and augmentation, as in canons.

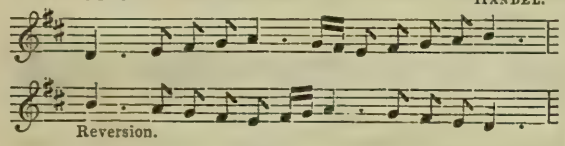
The subject is answered in inversion in the fugue of Handel's Overture to *Esther* :—

Ex. 531. HANDEL.



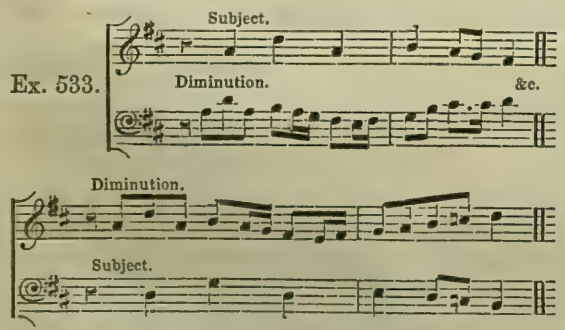
In the last movement of Handel's Oratorio of the *Messiah*, the subject is answered by reversion, which is very uncommon in fugues. See the next example, where the bars are omitted purposely, for the sake of avoiding a dissimilitude in the notation, which would render the contrivance less apparent :—

Ex. 532. HANDEL.



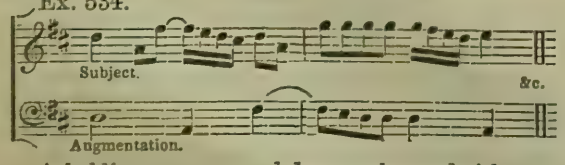
The following example is an answer by diminution from the chorus "Let all the Angels of God," from the Oratorio of the *Messiah*. See note on Counterpoint, page 47.

Ex. 533.



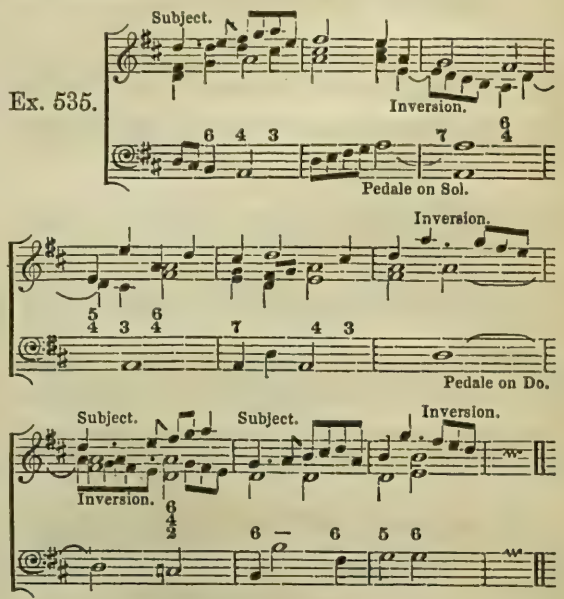
An answer by augmentation is shewn in the next example :—

Ex. 534.



A holding note, or *pedale*, may be used either on Sol or Do in the bass, and sometimes first on one and then on the other, for several bars immediately previous to the conclusion of a fugue. The subjoined passage from the last movement in the Oratorio of the *Messiah*, furnishes an example of this, which sometimes has also been called a *point d'orgue*, having originated in the use of the pedals attached to the lower notes of many church organs, particularly on the Continent :—

Ex. 535.



Of Imitation.

By Imitation, in this place,* is meant the resemblance between the melodies of the several parts of a score, in a less strict way than that of a canon or fugue; and which exists, more or less, in the scientific music of every age; excepting when the whole attention is intended to be directed to the principal melody, in which case alone such a bass and accompaniments as would suit one piece of music as well as another are admissible.

Under this head may be arranged all canons and fugues which are not strict throughout.

CHAPTER VIII.

Of Vocal and Instrumental Music.

The specimens hitherto adduced, and the compositions which the student has attempted (excepting rounds), may be considered as equally fit for either vocal or instrumental music, and a great deal of the best productions of all ages is thus doubtful in its character. Instrumental music is sometimes so smooth and vocal, that words might easily be adapted to it; and vocal music is frequently so decidedly expressive, that when sung to an unknown language, or performed on instruments, no aid of words seems requisite.

The expression of words is a subject which, perhaps, need not engross the first thoughts of the young composer, and which the author of the present treatise intends to consider, together with other subjects

* Imitation also signifies the endeavour of conveying an idea of storms, battles, waves, the singing of birds, ringing or tolling of bells, &c., by musical notes. This has often been absurdly extended to such objects in nature as have no sound, as the rising sun, lightning, snow, &c. See the Author's *Lectures on Music*.

equally connected with taste, in another work.* But it is conceived that a list of voices and instruments, with their compasses and clefs, will be found useful to the student in the present state of his progress.

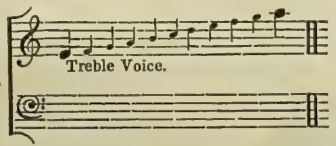
The student should be particularly careful in the manner of accenting his words in vocal music; and, for this purpose, he should mark them with long and short accents, observing that the most strongly accented syllables should fall on the beginning of the bar.

Voices are of four kinds,—treble, alto, tenor, and bass. Treble voices are of two kinds: the treble clef will show the scale of the high treble voice, and the tenor clef on the first line that of the low treble or mezzo soprano, according to the following rule, which will apply for general purposes to all clefs, but which is not applicable to songs, for which, indeed, no certain rule can be given.

General rule. The scale of a voice written in its own peculiar clef may extend from the first line of the stave to the first ledger line above.

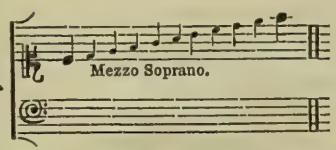
Thus the scale for the treble, canto, or soprano voice, will be,—

Ex. 536.



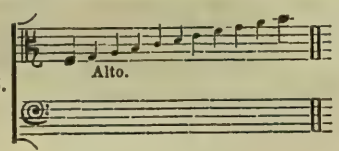
That for the low treble, canto secondo, or mezzo soprano,—

Ex. 537.



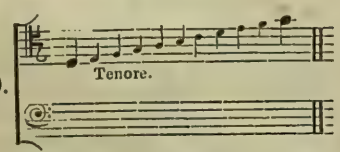
The scale for the alto, contralto, or counter tenor, will be,—

Ex. 538.



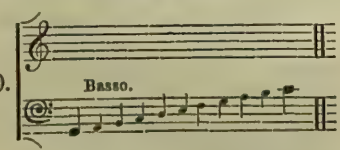
That for the tenore, or tenor,—

Ex. 539.



and that for the basso, or bass,—

Ex. 540.



* Lectures on Music, since published.

Instruments may be divided into:—

1st. Keyed instruments.
2nd. Stringed instruments.
3rd. Wind instruments.
4th. Instruments of percussion

1st. Of keyed instruments there have been many kinds, as organs, clavichords, virginals, spinets, harpsichords, and piano-fortes; of these only the organ and piano-forte are at present generally used.

All organs contain, at least, four octaves, *viz.*, five notes called C, as,—

Ex. 541.



including semitones, though the number of notes below or above the lowest and highest C is uncertain. The note below the lowest C♮ is made A on organs which have short octaves, and then the note below it is made G, and the scale commences thus:—

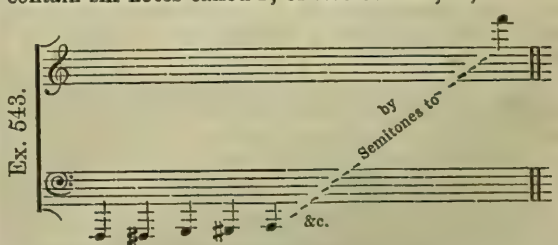
Ex. 542.



The most suitable passages for the organ are those which consist of slow and holding notes; distinct or quick passages should only be used for the sake of contrast, and passages of execution should be almost entirely excluded.†

As organs are at present tuned (with unequal temperament), keys which have many flats or sharps will not have a good effect, especially if the time be slow. Harpsichords in general, and piano-fortes as they were originally made, without additional keys, contain six notes called F, or five octaves, as,—

Ex. 543.

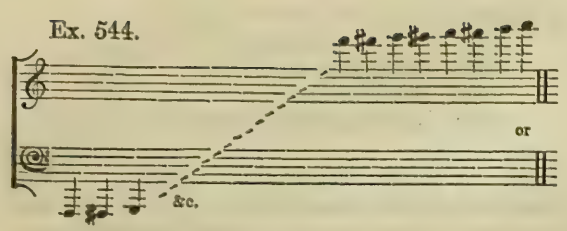


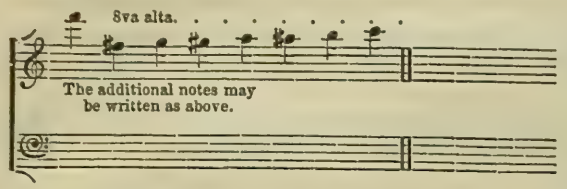
Pianofortes with additional keys above, ascend to C; and those with additional keys below begin from C, and contain six octaves:—‡

† In composing for keyed instruments, the number of notes which the hand can grasp should be considered.

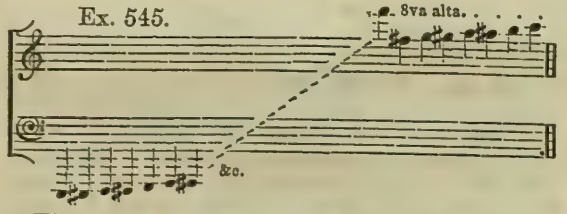
‡ Since the first publication of this work, the scale of pianofortes has been extended.

Ex. 544.





Ex. 545.



The peculiar characteristic of the harpsichord was clearness, or precision. That of the pianoforte (as its name implies), is its power of varying the degree of loudness and softness, either suddenly or by the crescendo, diminuendo, rinforzando, &c.

2nd. Stringed instruments played with the bow consist at present of violins, tenors, violoncellos, and double basses.*

The scale and clef of the violin is,—

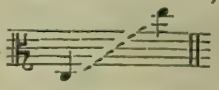
Ex. 546. 

In solos and solo concertos the violin scale may extend an octave higher, but this is a species of music which no young composer should attempt, unless he is himself a performer on the instrument for which he writes.

In scores there are generally two violin parts.

Stringed instruments, played with the bow, are superior in point of expression to keyed instruments, as they combine the sostenuto of the organ, the precision of the harpsichord, and the variety of power of the pianoforte; and are also capable of producing the smallest intervals.

The tenor, or *alto viola*, is a larger kind of violin; or, to speak more correctly, the violin is a diminutive viola or viol. Its scale and clef are,—

Ex. 547. 

The scale and clef of the violoncello are subjoined. This scale, in solos, may be extended upwards considerably.

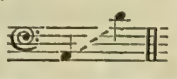
Ex. 548. 

* In composing for stringed instruments, such chords, or double stops, must not be used as cannot be executed. The student may acquire his knowledge of these either by consulting a performer, or by avoiding all passages for which he can find no authority in the works of the great masters.

The usual compass of the double bass is,—

Ex. 549. 

but it is written an octave higher than it is intended to be played, thus :—

Ex. 550. 

In general, however, a separate part is not composed for the double bass, but the performer looks out of the violoncello book, playing the same notes an octave lower, or omitting such notes as he thinks proper. The words *solo violoncello* and *tutti bassi* are used to show when these instruments are to play separately, and when together; but separate lines, and an occasional difference in the passages, are rather recommended.†

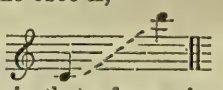
3rd. The principal wind instruments now in use are flutes, oboes, clarionets, bassoons, horns, trumpets, and trombones.

The scale of the German flute is,—

Ex. 551. 

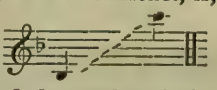
Its principal key is D major with two sharps, and other keys are proportionably unfit for the instrument as they are further removed from this key. The most proper passages for the flute are sweet and soft melodies. In full parts high and lengthened notes are given to it in modern music; and, indeed, the general use of wind instruments in the full parts of modern music, is to sustain the principal or essential notes of the harmony, and to supply the want of voices or of the organ.‡

The scale of the oboe is,—

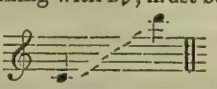
Ex. 552. 

its principal key is that of C major. Keys which have many flats or sharps should therefore be avoided in solos, but in full music this instrument is used in almost all keys.

The scale of the clarionet, most frequently used in concerts, called the B flat clarionet, is,—

Ex. 553. 

Its compass extends lower than is here shown, but that part of its scale is not perfectly in tune. All music for this instrument must be written one note higher than it is intended to be played. Thus the above scale, beginning with B♭, must be written thus :

Ex. 554. 

† The harp is a stringed instrument seldom used in concerts, excepting in solo concertos. Its compass very much resembles that of the pianoforte.

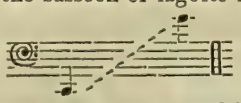
‡ The flauto piccolo is a shrill flute used by Handel to imitate the singing of birds; and by Glück for the howling and whistling of the wind. If written according to the scale of the German flute, it will sound one octave higher.

Its most agreeable keys are those which have flats. The clarionet is naturally a very powerful instrument, and was originally appropriated to military bands.

Three other kinds of clarionet are used in military bands, besides that above described; one called the C clarionet, a smaller one called the F clarionet, which goes four notes higher, and one in A. In composing for the C and the F clarionets no transposition of notes is required. They are used in military bands. Music for the A clarionet must be written a minor third higher than it is intended to sound. The B flat and A clarionets are the only ones used in concerts, the one for keys which have flats, and the other for keys which have sharps.

The scale of the bassoon or fagotto is,—

Ex. 555.



This instrument can play equally well in all the usual keys. It may be used either as a bass to the other wind instruments, or in the tutti parts it may play in unison with the bass stringed instruments.

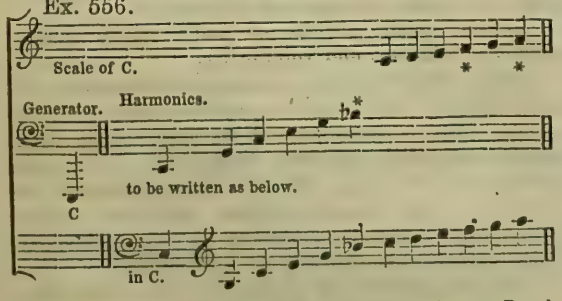
The horn and trumpet have similar scales. The generator, or key note, is the sound of the whole tube, which, however, is never used, the sounds consisting entirely of the harmonics or notes produced by the aliquot parts of the tube: *viz.*

Do, the octave to the generator, produced by	$\frac{1}{2}$
Sol, the 12th, or 5th above the last note	$\frac{1}{3}$
Do, the 15th, or 4th above the last note	$\frac{1}{4}$
Mi, the 17th, or major 3rd above the last note	$\frac{1}{5}$
Sol, the 19th, or minor 3rd above the last note	$\frac{1}{6}$
Za,† the 21st, or minor 3rd above the last note	$\frac{1}{7}$
Do, the 22nd, or 2nd above the last note	$\frac{1}{8}$
Re, the 23rd, or 2nd above the last note	$\frac{1}{9}$
Mi, the 24th, or 2nd above the last note	$\frac{1}{10}$
*Fa, the 25th, or minor 2nd above	$\frac{1}{11}$
Sol, the 26th, or major 2nd above	$\frac{1}{12}$
*La, the 27th, or 2nd above	$\frac{1}{13}$

Other notes have been used by respectable composers, but even all the above are not recommended to the young composer, as those marked thus (*) are out of tune on the common horn and trumpet.‡

The scale of the horn in the key of C, is given below. It is to be written an octave higher than it is intended to be performed:—

Ex. 556.

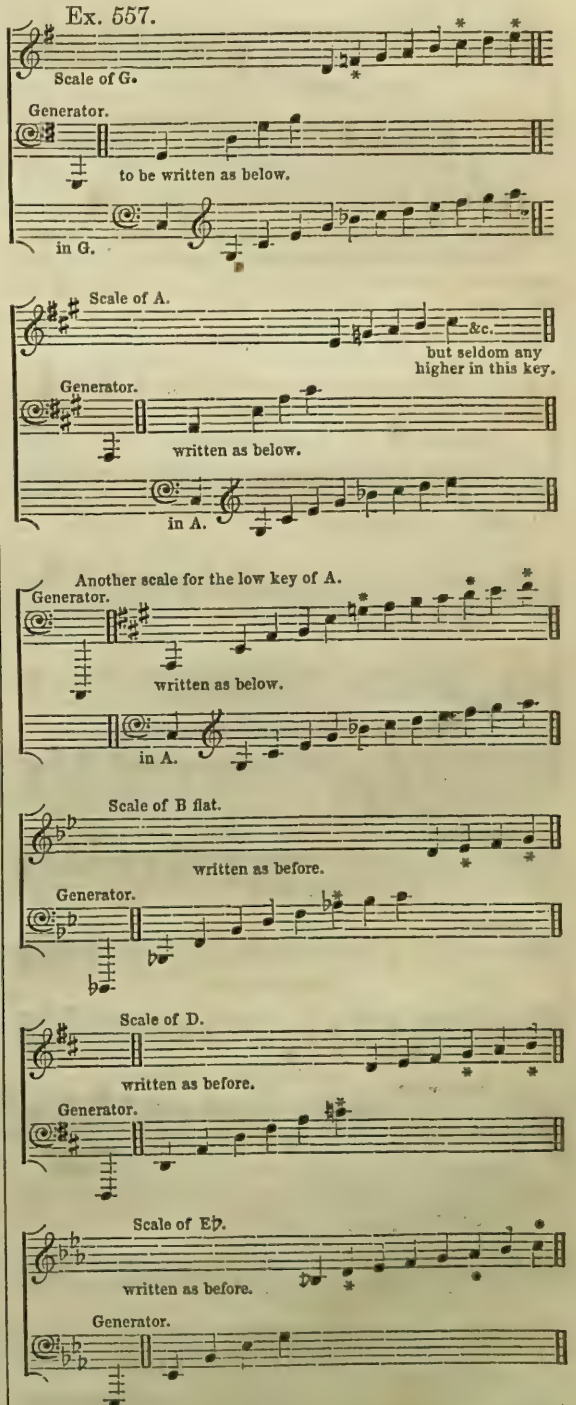


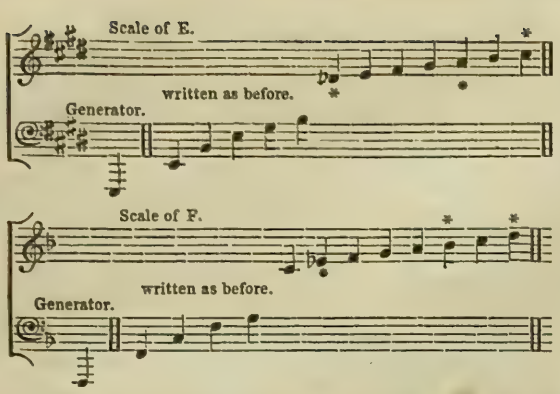
† Za is a name given to this species of flat seventh by some French writers.

‡ Modern horn players attempt to make these notes in tune by inserting the hand into the bole of the horn; and a sliding mouth-piece has been used, with good effect, to the trumpet for the same purpose.

By the use of crooks the horn is enabled to play also in the keys of G, A, B♭, D, E♭, E, and F, as in the following example; yet all the music for the horn is to be written in the key of C, specifying at the beginning of the movement what the key is, as C, D, G, &c:—

Ex. 557.

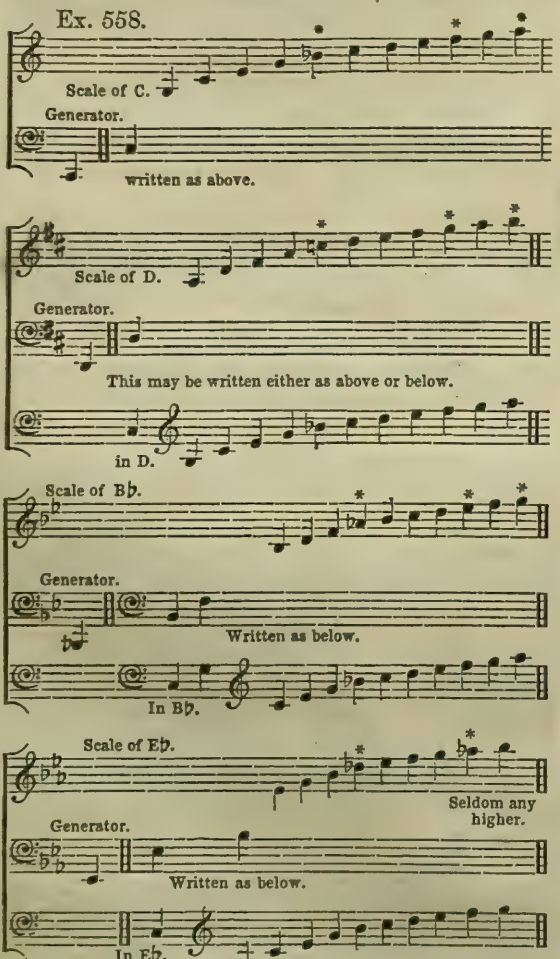




The horn is capable of such various degrees of piano and forte, that it is used in all kinds of music.

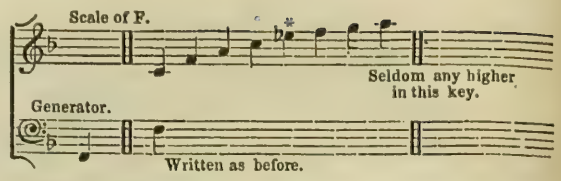
The scales of the trumpet in the keys of C and D, which are the most common keys, and those of B♭, E♭, and F, are subjoined. The trumpet is not so often used in soft as in loud music.†

Ex. 558.



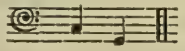
† The scale of the bugle horn, and indeed of all simple tubes, is similar to that of the horn and trumpet; its generator is usually an octave higher than that of the trumpet, and it can seldom produce more than the five first harmonics. It is not used in concerts.

Since writing this, the bugle has been rendered a perfect instrument by the addition of keys somewhat similar to those of the oboe and clarionet. The corno Inglese and corno di bassetto among wind instruments, and the side drum, Prussian drum, and Indian gong, among those of percussion, are very seldom used.

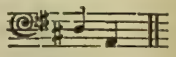


The trombone, or sackbut, has a sliding mouthpiece, and can express any interval. It is of three kinds, alto, tenor, and bass. These may either be in unison with the alto, tenor, and bass voice parts of a full chorus, or, which is far better, may have separate parts written for them. They are capable of producing very good effects both in loud and soft passages.

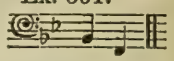
4th. Instruments of percussion comprehend cymbals, triangles, carillon or bells, &c.; but the only instruments of this kind now used in concerts are the kettle drums or double drums, of which a pair may be tuned to the bass notes C and G in the key of C,—

Ex. 559. 

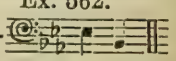
Ex. 560.

or to D and A, in the key of D,— 

Ex. 561.

B♭ and F, in the key of B♭,— 

Ex. 562.

and E♭ and B♭, in the key of E♭,— 

but the latter two are peculiar to modern music. The same notes are used for double as for kettle drums.

The drum sometimes may be used to mark, by a single note, the commencement of a bar, or to give force to a loud passage, by a continued beating; but the finest effect produced by it is a roll during a pedale note in the bass, or a crescendo.

It is scarcely necessary to remark, that, since the publication of the original editions of this work, many alterations have been made in the scales and powers of the instruments here mentioned. For the fullest and latest information on this subject, the student is referred to the "Treatise on Modern Instrumentation and Orchestration," by Hector Berlioz—a Translation of which, by Mrs. Cowden Clarke, has lately appeared in the series of which the present work forms a part.

Music may also be divided into that for the church, oratorio, opera, concert, and chamber.

Church music consists of psalm tunes, chants, services, anthems, and voluntaries.

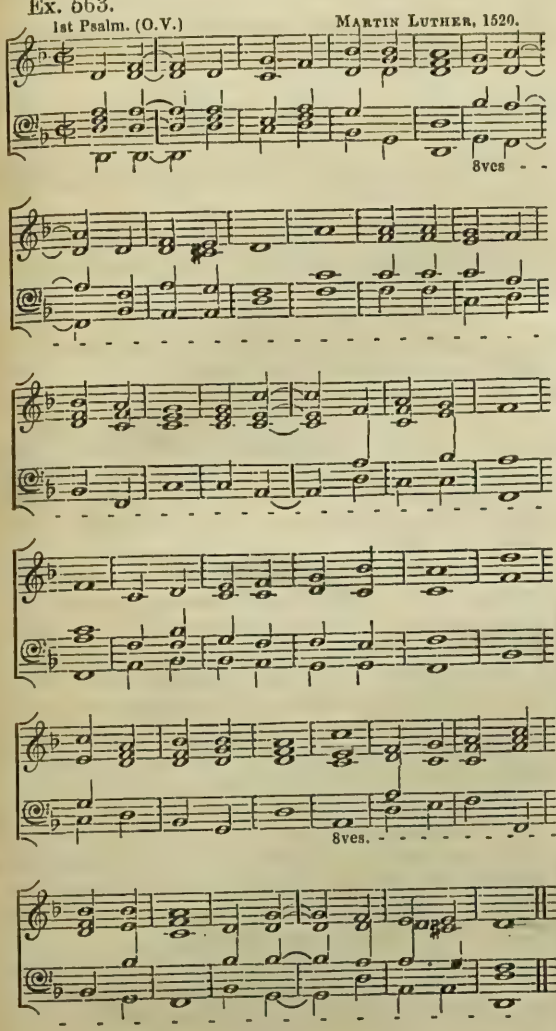
Psalm tunes ought to consist chiefly of semibreves and minims, with very few crotchets or other short notes. The harmony should be very simple, consisting chiefly of concords, with a few of the most simple discords, as a fifth and fourth, seventh and third, dominant seventh, added sixth, and such of the simple diatonic successions as the student has been cautioned to avoid in modern music.

The best models for psalms are the oldest, *viz.*, those of the reformers and old English organists.‡

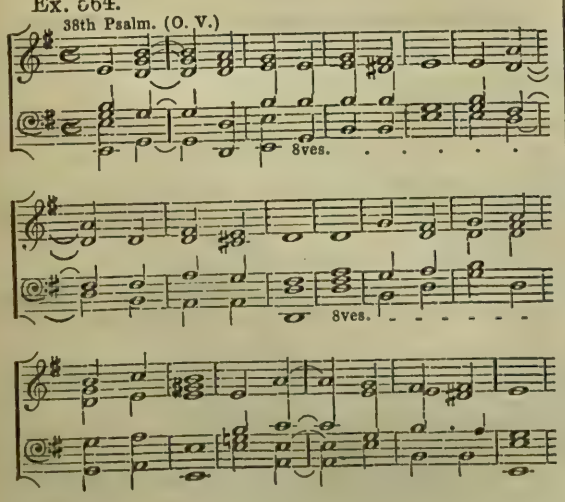
‡ See also a *Collection of Psalms* edited by the author of this work.

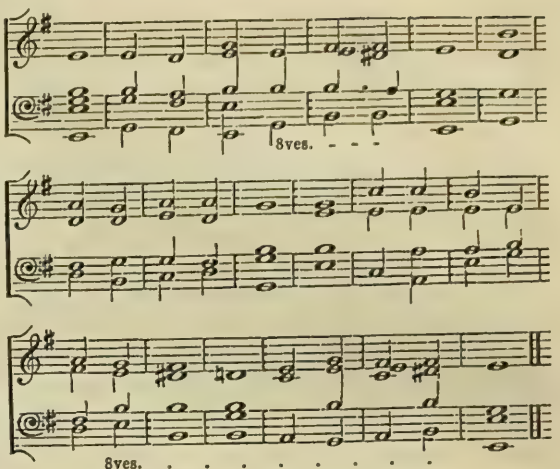
Four psalm tunes of this class are subjoined, as given in the *Specimens*.

Ex. 563.

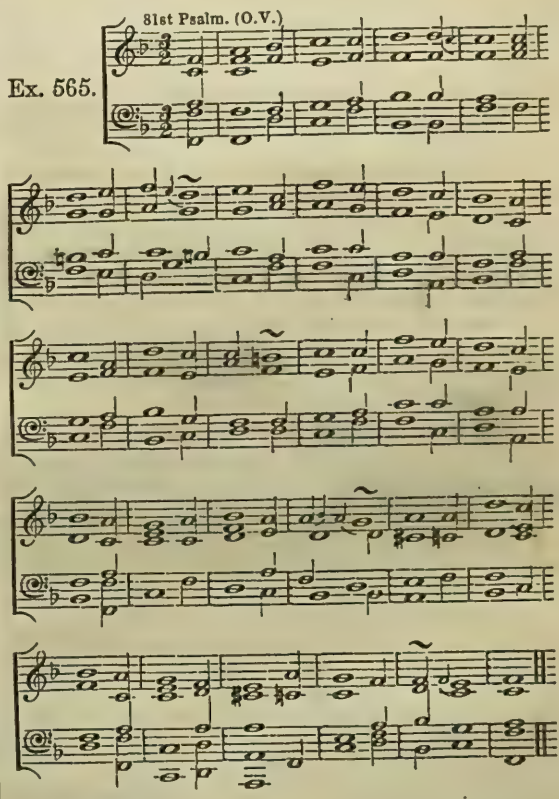


Ex. 564.

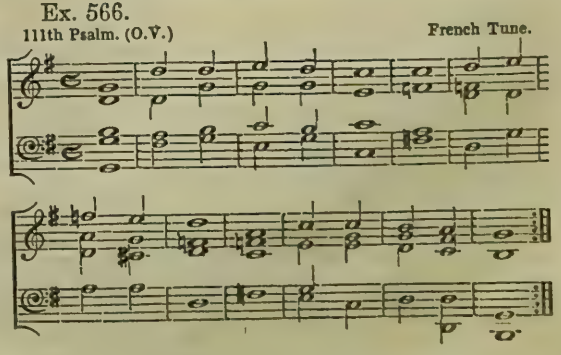


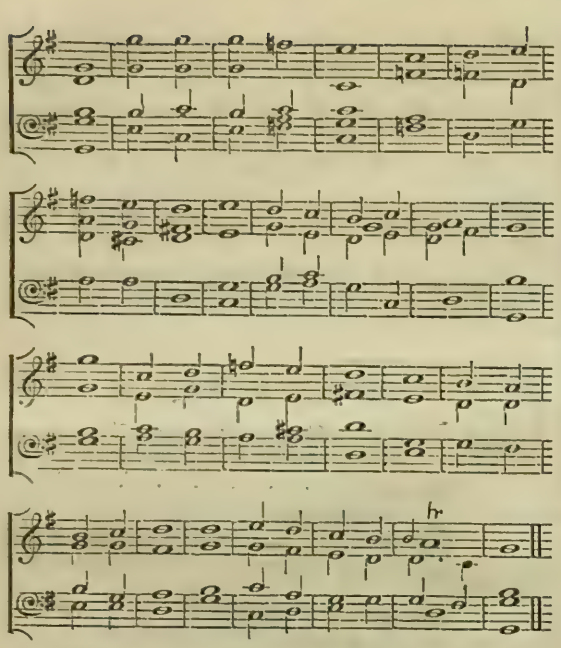


Ex. 565.



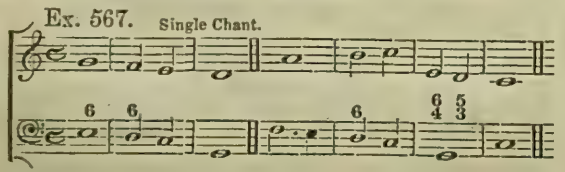
Ex. 566.



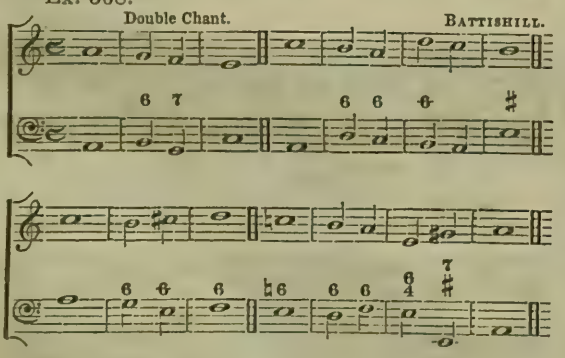


Chants are sung in cathedrals to the psalms of the day, and are of two kinds, single and double. Examples of each kind are subjoined. Single chants consist of two parts, the first of three and the second of four bars, the whole lasting one verse. The double chant consists of four parts, the first and third of three bars, the second and fourth of four, and the whole lasting two verses. The first and last bars of each part of a chant must consist of semibreves, and the intermediate bars of minims.

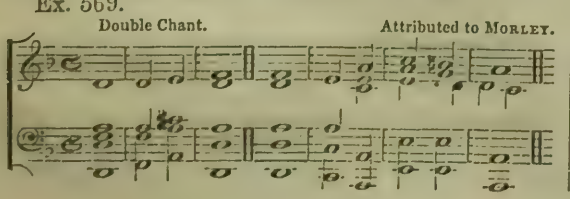
Ex. 567. Single Chant.

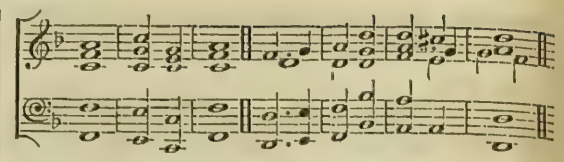


Ex. 568. Double Chant. BATTISHILL.

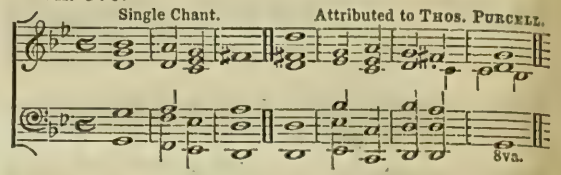


Ex. 569. Double Chant. Attributed to MORLEY.





Ex. 570. Single Chant. Attributed to THOS. PURCELL.



Though the number of bars and notes in a chant is so limited, yet great variety may be effected by the aid of canon, fugue, or imitation.

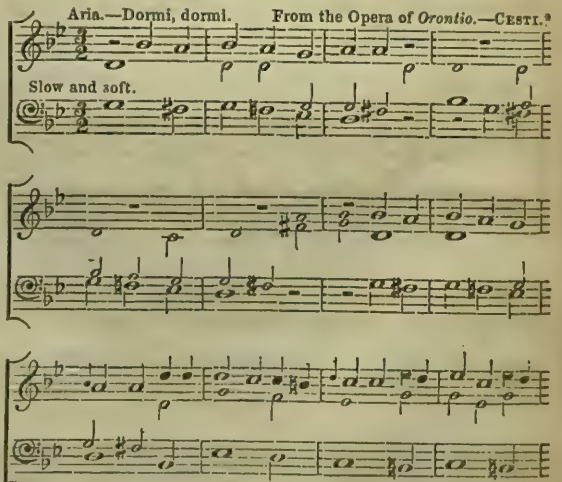
Services consist of the Te Deum and Jubilate, or the Benedicite and Benedictus, Sanctus, Responses, Nicene Creed, Magnificat and Nunc Dimittis, or Cantate Domino, and Deus Misereatur; Burial Service, &c. Boyce's Cathedral Music, especially the first volume, contains the finest specimens of this kind of music.

Services may be either full or interspersed with verses, but the former are recommended as being most decided in style; verse services very much resembling anthems.

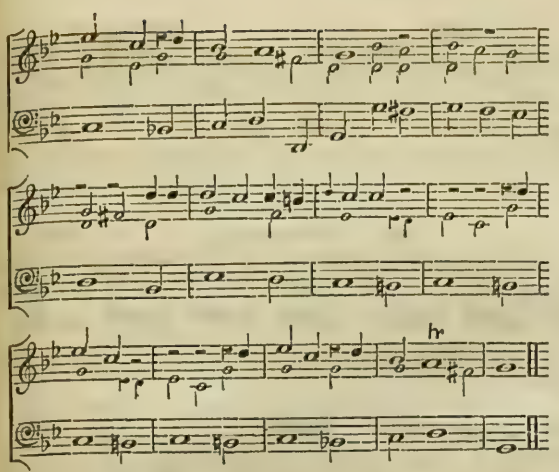
Anthems are either full or verse; the former should be first attempted by the student, as the varieties of the latter are almost endless. Boyce's second volume abounds with fine full anthems, as the third does with verse anthems.

Organ voluntaries should consist of fugues, with introductions for the full organ, upon the model of Sebastian Bach and Handel. Soft movements for the diapason and swell should be slow and sweet, or mournful and pathetic, and may be in the Italian style of the seventeenth century.

Ex. 571.



* *Dr. Crotch has here referred to the second volume of his Specimens, without selecting any particular example. The editor has therefore ventured to insert from that volume the above air, by Marc Antonio Cesti, a pupil of the celebrated Carissimi, and whose opera, "Orontio," was first performed at Venice in 1649, and long enjoyed an extensive popularity in Italy.*



English voluntaries for the trumpet, echo, vox-humane, cornet, oboe, and other solo stops, are too often vulgar, trifling, and ridiculous; being equally void of science, taste, and that decorous gravity of style which should ever characterize church music.

Oratorio music consists of an overture with occasional instrumental symphonies, marches, minuets, dances, &c., the vocal part consisting of recitatives, and accompanied recitatives, airs or songs, duets, trios, quartetts, quintetts, semichoruses, choruses, double choruses, &c.

Under the head of oratorios may be comprehended not only sacred dramas, but anthems, services, masses, and all church compositions for a full orchestra, and even secular dramas, not acted, as masques, serenatas, odes, &c.

The opera is a secular drama set to music entirely, and acted. It consists of the same kind of movements as the oratorio, excepting the double chorus. Indeed, the manner in which all choruses are necessarily performed on the stage, precludes the possibility of having science and ingenuity in their contexture.

The music of dances and ballets is capable of being made the most ingenious and playful of the instrumental kind.

Concerts consist, generally, of selections from church, oratorio, opera, and chamber music. The only pieces expressly composed for a concert being concertos, solo concertos, symphonies, and occasionally overtures and songs.

A concerto is an instrumental full piece, with occasional solos for particular instruments. Solo concertos (sometimes called violin concertos, organ concertos, &c.) are intended to display the powers of particular single instruments, with accompaniments for a full band.

The overtures of Bach, Abel, Van Maldere, &c., were similar to the opera overtures of the same period, consisting, generally, of three movements; but the modern concert symphony consists, generally, of four or five movements.

Concert songs differ in no respect from oratorio or opera songs.

Chamber music may be divided into vocal and instrumental. The former consists of cantatas, canzonets, or other songs, with an accompaniment for the pianoforte, harp, violoncello, or, at most, two or three instruments; also of duets, trios, madrigals,* or glees, rounds, canons, &c. The latter consists of sonatas for the pianoforte, with or without accompaniments; duets, for two performers on the pianoforte; solos, for the violin, violoncello, &c., with an accompaniment for the pianoforte or violoncello; duets for violins, &c., trios, quartetts, quintetts, &c. Of these the young composer is recommended to prefer for his own study, madrigals and quartetts; in writing the former he will make real parts for voices, in the ancient style, and in writing the latter he will make real parts for instruments in the modern style.

The student is, lastly, recommended to perform the following tasks:—

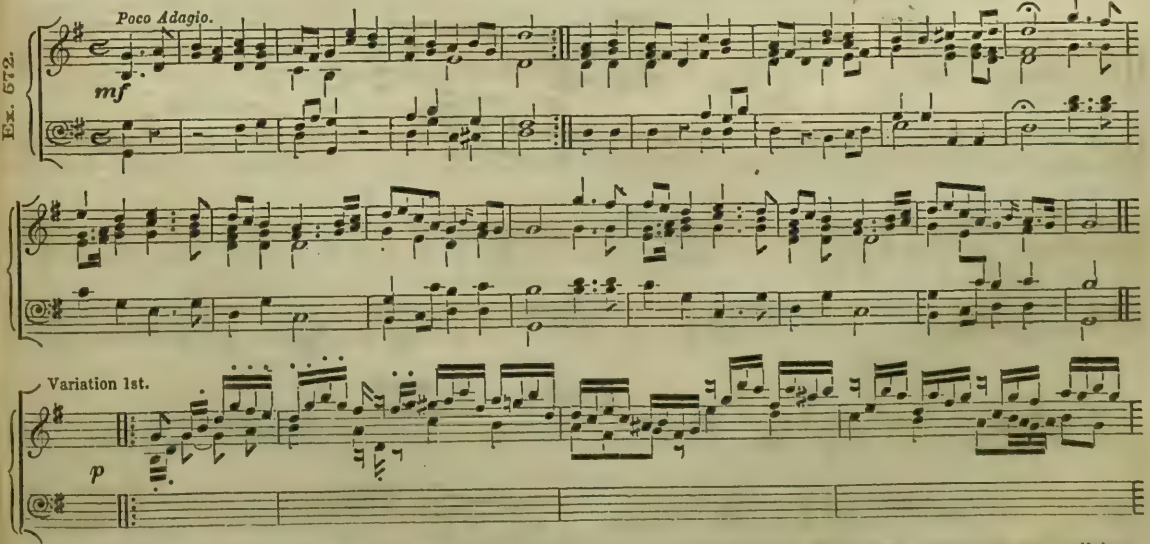
1st. To make variations to airs in the manner of different masters, especially in a score of four parts.

2nd. To put different basses to a given treble.

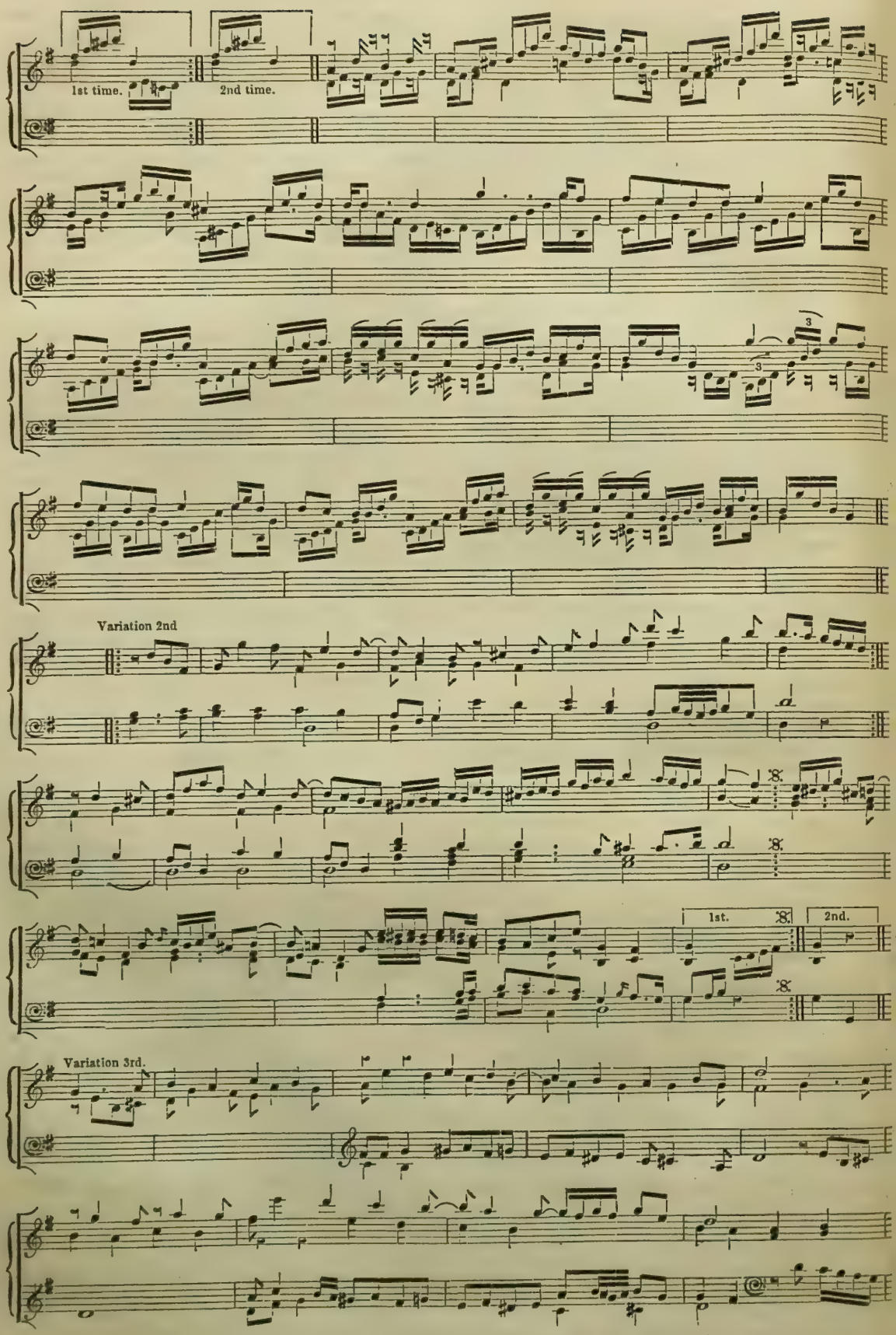
3rd. Different trebles to a given bass.

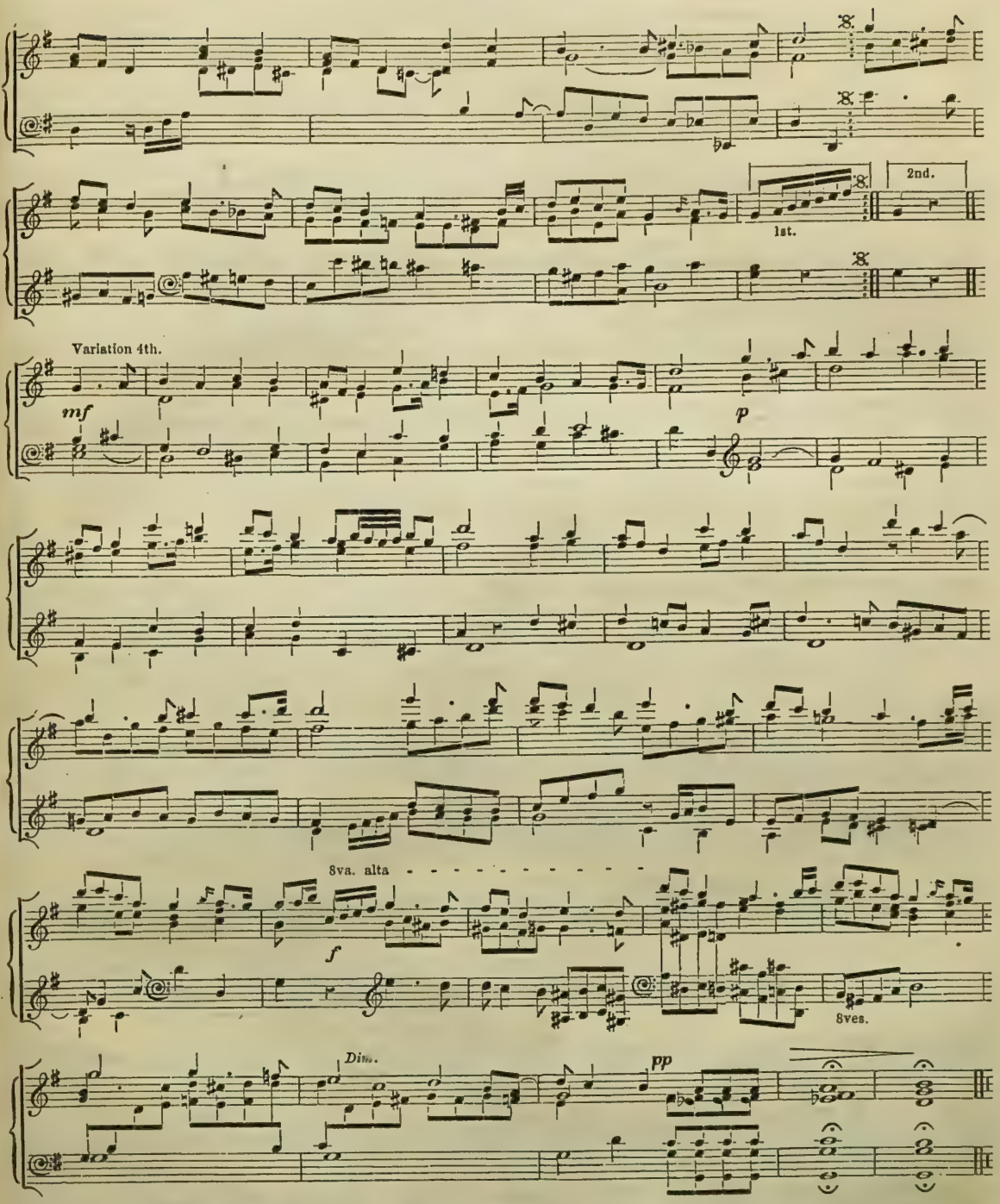
4th. Different trebles and basses to a given inner part. All these are exemplified in the following beautiful air, with variations, by Haydn:—

Ex. 672.



* A Madrigal is a vocal composition consisting generally of more than four parts, the words of which are pastoral. Motetts are set to religious subjects. The modern terms for these are glee, and serious glee.

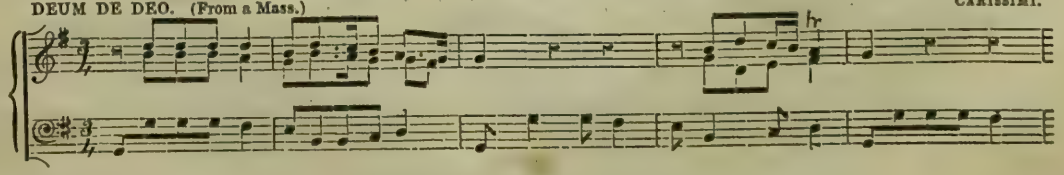

1st time.
2nd time.
Variation 2nd
1st.
2nd.
Variation 3rd.

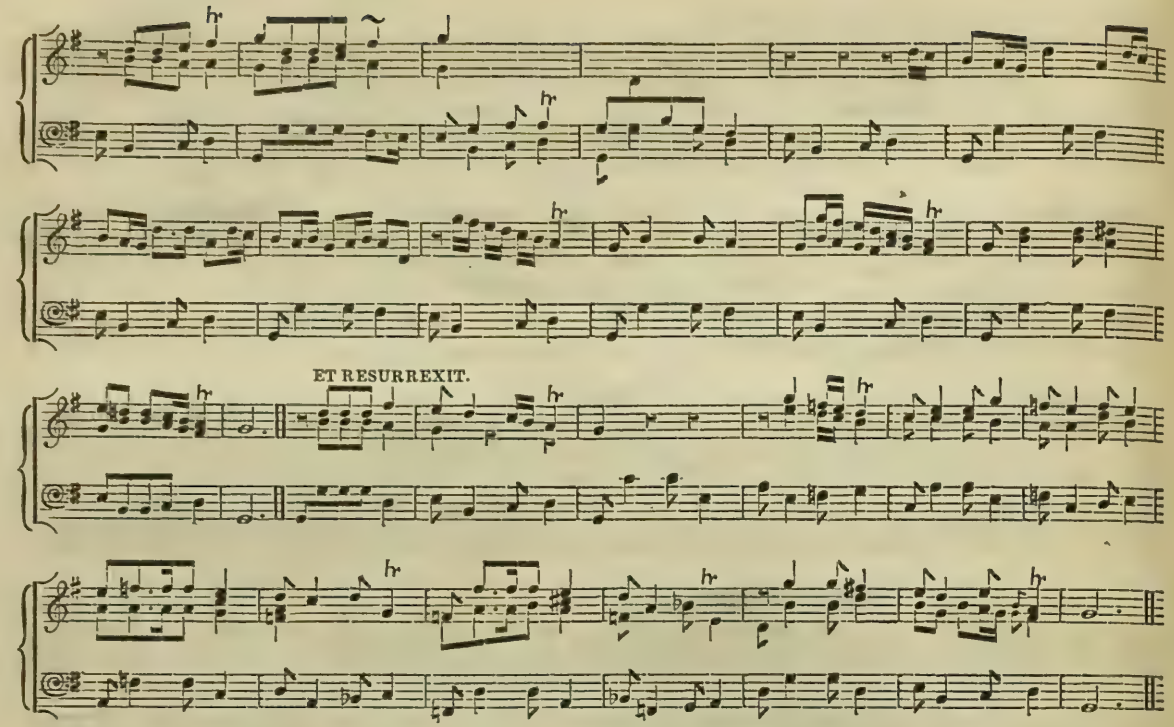


5th. To write accompaniments on a ground bass, which consists of a constant repetition throughout a whole movement of the same short subject, with different accompaniments. It has always been recommended as a task for young composers. The following are examples of this mode of composition.

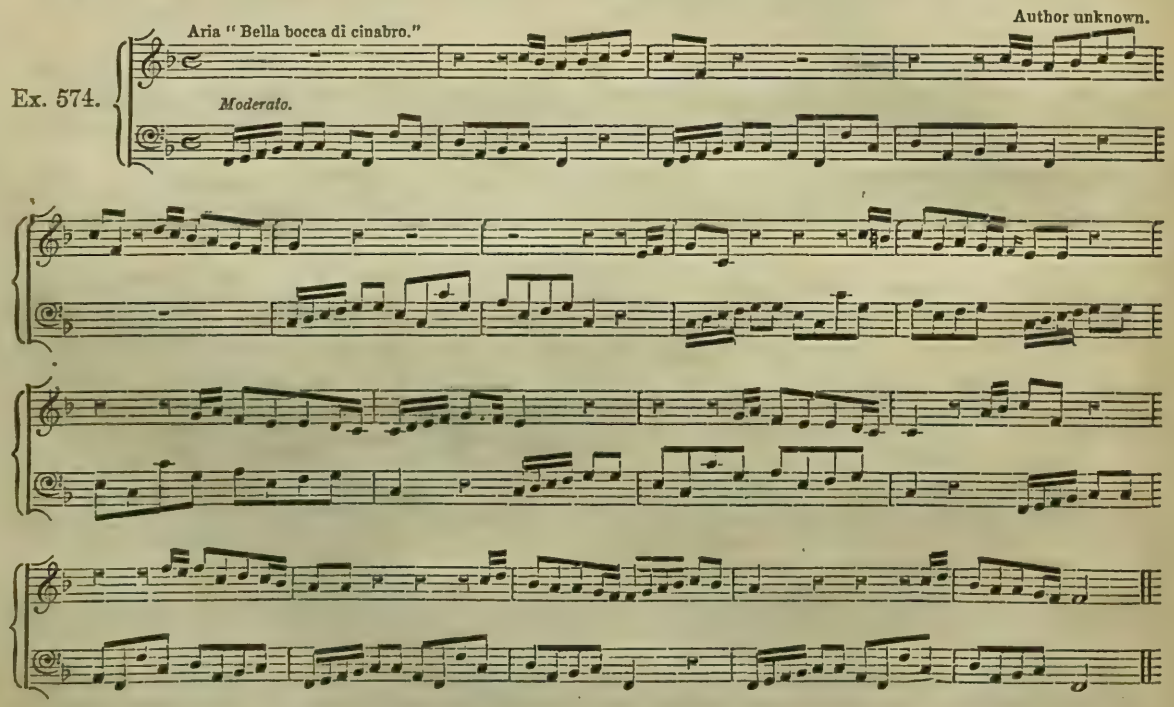
Ex. 573.

DEUM DE DEO. (From a Mass.) CARISSIMI.

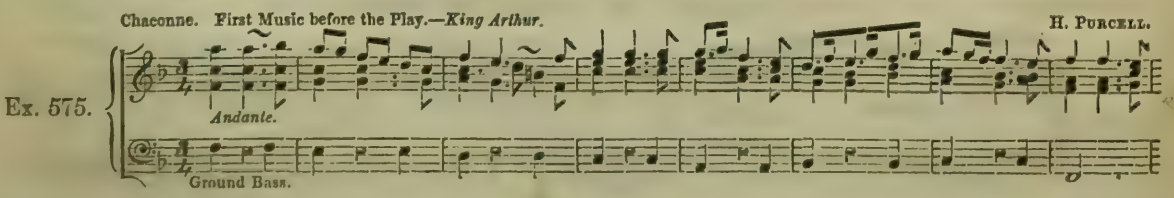


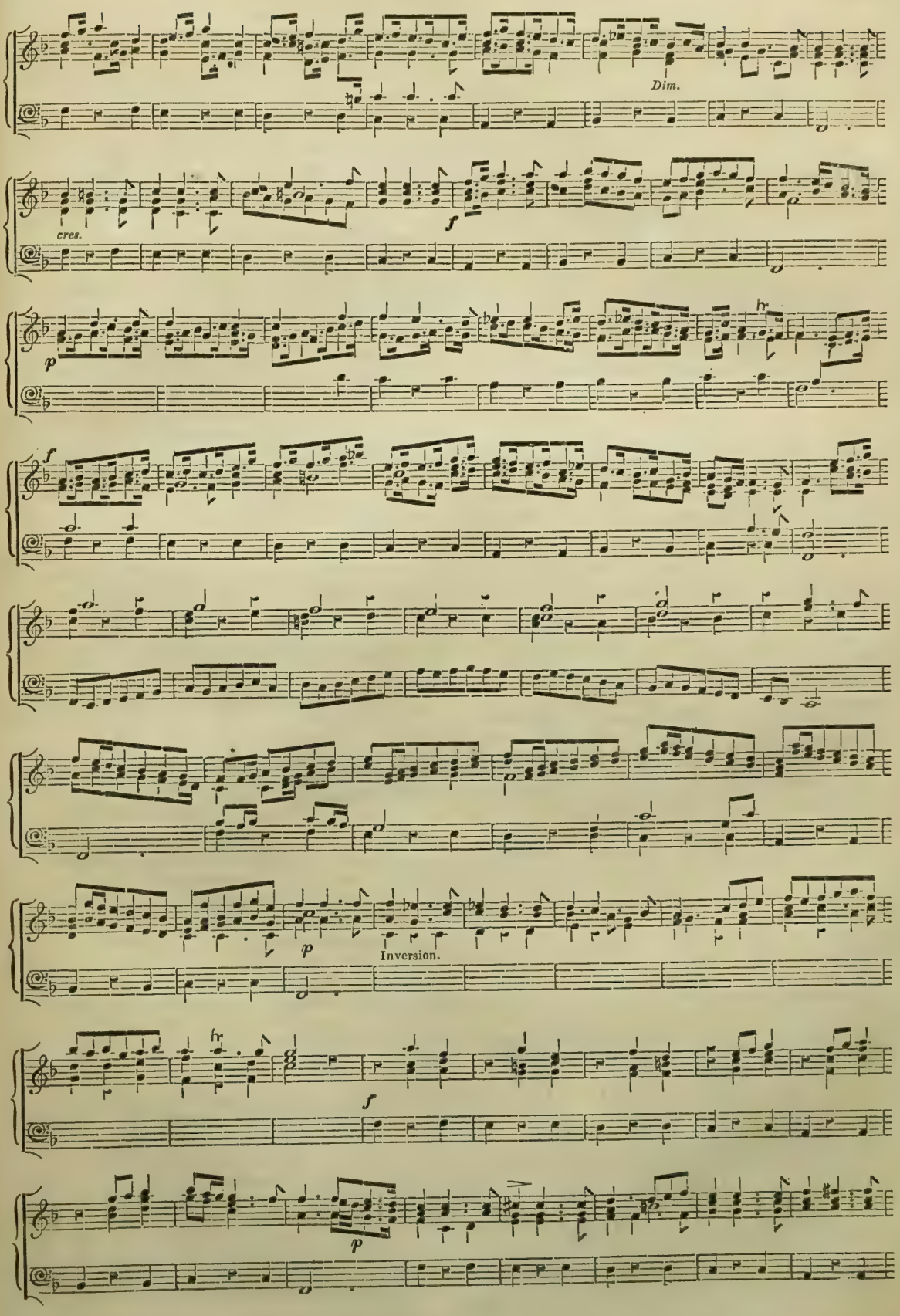

ET RESURREXIT.

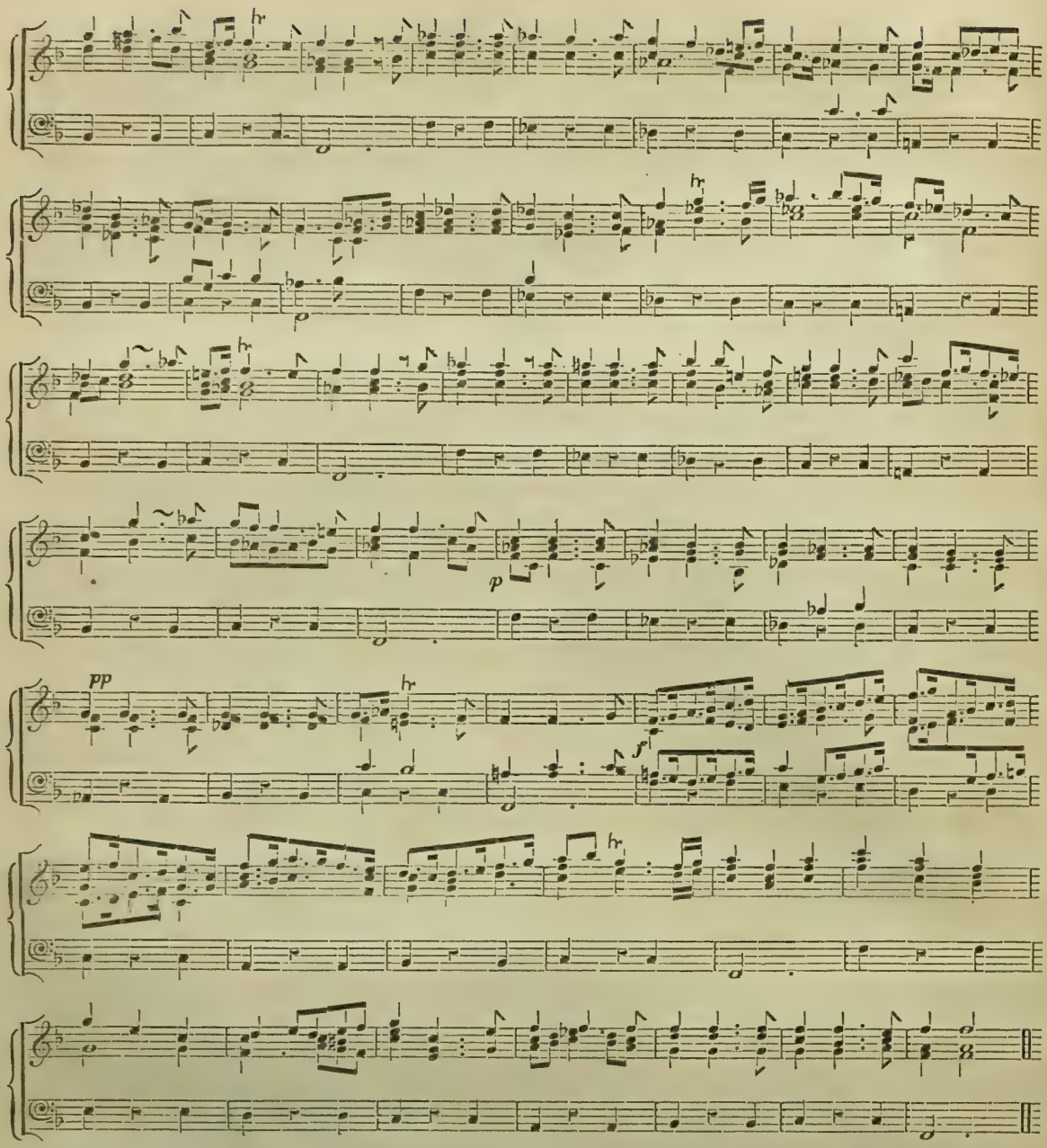
Ex. 574.


Aria "Bella bocca di cinabro."
Author unknown.
Moderato.

Ex. 575.


Chaconne. First Music before the Play.—King Arthur.
H. Purcell.
Andante.
Ground Bass.


Dim.
cres.
f
p
f
p
Inversion.
f
p



The student is now left to form his taste by the study of the various styles of music. This is not considered as a proper subject for the present work, which is chiefly intended to enable the student to compose with grammatical correctness.*

CHAPTER IX.

Of the Derivation of the Scale, Tuning, Temperament, the Monochord, &c.

The derivation of the scale of the major or minor key is a subject upon which many hypotheses have been framed, and which seems likely to continue a matter in dispute. Some authors derive it from that of the harmonics, but the resemblance does not seem sufficiently close to warrant such an hypothesis. See the scales of the horn and trumpet in the preceding chapter.

Tartini, in order to obtain the notes of the major key, takes the three notes Do, Fa, Sol, expressed by the numbers 6, 8, 9, which show the respective proportional number of vibrations of each note, as C, F, and G, in the key of C major; and then adds to each of them the principal or loudest harmonics which they produce, *viz.*, the perfect chord or major third and fifth.† Thus C gives E and G, F gives A and C,

* For further remarks on the various styles of music, see *Lectures on Music* by the author.

† Let any of the lowest notes of a pianoforte, harp, violoncello, or of the diapasons of an organ, be struck and continued sounding, an ear accustomed to the experiment will distinctly hear the perfect chord of that note, and probably several of the other less audible harmonics.

and G gives B and D; thus filling up the scale, for which reason a succession of triads falling a fifth has ever been agreeable to the ear, as Sol, Do, Fa; and the numbers 6, 8, 9, and 12 (which express these notes Do, Fa, and Sol, together with the octave to Do), have ever been famous above all others among the ancients, and when tuned by the ear in the following manner, give the major scale as invented by Ptolemy.

Tune the notes G, F, and E, by the ear, respectively a perfect fifth, perfect fourth, and major third to (*viz.*, above) C. Then make A a major third to F, and B a major third to G, and D a perfect fourth below it.

Pythagoras was the inventor of the harmonical canon or monochord, which is merely a string having a board under it of exactly the same length, upon which may be delineated the points at which the string must be stopped to give certain notes. This delineation of ratios renders them capable of being compared, and their respective proportions accurately measured and ascertained.

Figures 1, 2, and 3, are a section plan and view of a monochord of the most simple construction.

Fig. 1.

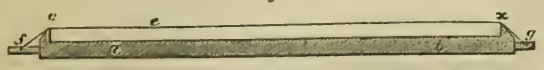
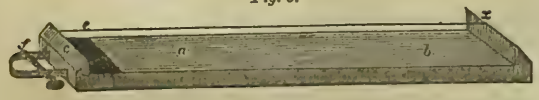


Fig. 2.



Fig. 3.

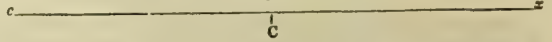


In each of these figures, *a b* is a board made too thick to warp, having at each end *c x*, two supports for the string, of which it is required that the internal sides must be perpendicular, and the upper edge not rounded off, that the length of the string and that of the board may exactly correspond; this length is here supposed to be three feet. *e* is the string which is here supposed to be a steel wire called No. 11. The ends of the wire are attached to a peg at each end, *f* and *g* (the latter of which is not visible in figure 3), placed at right angles to the string. Both of these are to be turned in tuning the string, for if only one peg is used the string is apt to stretch more at that end than at the other, and consequently to be inaccurate.

The manner of using the monochord is first to place it on a table, which acts as a sound board to it, augmenting its power. Next tune the string to C, on the second space of the bass clef, by some other instrument, or by a pitch, or tuning fork. Pinch the string with the finger and thumb* of one hand, taking care not to force the string out of the straight line, and bow on the string with a violin bow in the other. The student may either mark the board according to his own discoveries of the notes produced by the string, or, which is rather recommended, he may draw lines on the board parallel to the string, and on them mark the places where he is to stop the string in order to produce the notes.

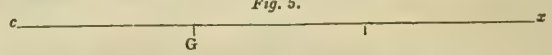
Divide the whole string *c x* (fig. 4) into halves by pinching it at C, the half C *x* will sound one octave above *c x*, the whole string.

Fig. 4.



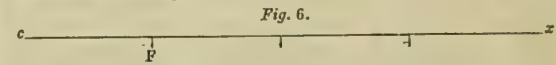
Divide the whole string *c x* (fig. 5) into three equal parts, and pinch the string at G, the remaining two thirds G *x* will give the note G, a fifth to the whole string.

Fig. 5.



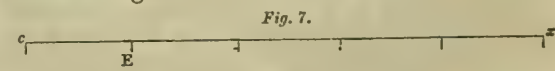
Divide the whole string *c x* (fig. 6) into four equal parts, and pinch the string at F, the remaining three quarters F *x* will give the note F, a fourth above the whole string.

Fig. 6.



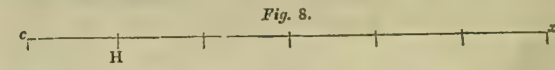
Divide the whole string *c x* (fig. 7) into five equal parts, and pinch the string at E, the remaining four fifths E *x* will give the note E, a major third to the whole string.

Fig. 7.



Divide the whole string *c x* (fig. 8) into six equal parts, and pinch the string at H, the remaining five sixths H *x* will give the note E♭, a minor third above the whole string.

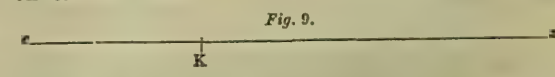
Fig. 8.



And in the same way the octave, fifth, fourth, major third, and minor third, may be found to any given note on the monochord.

Let K (fig. 9) be the given note; in order to find the octave to K, consider K *x* as a whole string, and divide K *x* into two parts, and pinch it so as to take off one of them.

Fig. 9.



If the fifth to K is wanted, divide K *x* into three parts, taking off one.

If the fourth to K is wanted, divide K *x* into four parts, taking off one.

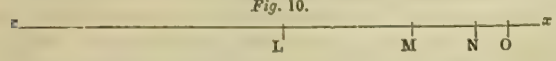
If the major third is wanted, divide K *x* into five parts.

And if the minor third is wanted, divide K *x* into six parts.

* A sliding bridge would doubtless be much more accurate, but also more difficult of performance, and perhaps not necessary for the purposes here required; namely, of enabling the student to tune, or at least to comprehend the nature of tuning.

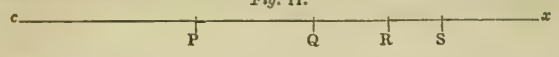
Thus the octave to *c x* (fig. 10) is L *x*, the octave to L is M *x*, the octave to M is N *x*, the octave to N is O *x*, and so on, *ad infinitum*.

Fig. 10.



In the same way the fifth to *c x* (fig. 11) is P *x*, the fifth to P is Q *x*, the fifth to Q is R *x*, the fifth to R is S *x*, &c.

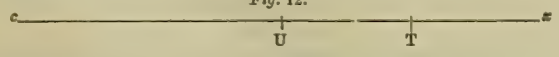
Fig. 11.



And by reversing the process, the notes below a given note may be found, provided they are not more grave or deep than the generator, or note given by the whole string *c x*.

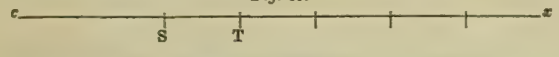
To find the octave below a given note T (fig. 12) set off U to the left of T, equal to T *x*; U *x* will be the octave below T *x*.

Fig. 12.



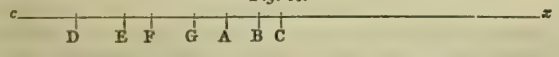
To find the major third below a given note T (fig. 13) divide T *x* into four equal parts, and set off T S equal to one of them; S *x* will be the major third below T *x*.

Fig. 13.



In order to tune the major key of C according to the methods of Ptolemy and Tartini, make E a major third to the whole string *c x* (fig. 14), and G a fifth to it; F a fourth to it, A a major third to F, B a major third to G, D a fourth below G, and C an octave to the whole string.

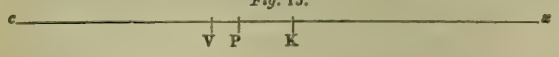
Fig. 14.



The point D will be found to be one-ninth of the whole string *c x*, from *c*; or rather the note D *x* is eight-ninths of the whole string *c x*; and this interval, from *c* to D, is called a major tone, and it is the difference between a fourth and a fifth; for if a fourth be subtracted from a fifth the remainder will be a major tone.

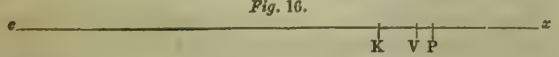
Thus to find the major tone above any given note V (fig. 15), find K a fifth above V, and P a fourth below K; P *x* will be a major tone above V *x*;

Fig. 15.



or let V (fig. 16) be the given note, make K a fourth below V, and P a fifth above K; P *x* will be a major tone above V *x*.

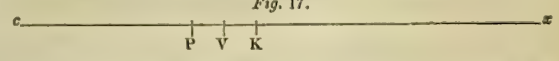
Fig. 16.



But the point E♯ (fig. 14) will not be a ninth part of D *x*, but a tenth part; or, in other words, the note E *x* is not a major tone from D. The interval thus obtained is called a minor tone, and is the difference between a major tone and a major third; for if a major tone be subtracted from a major third, the remainder will be a minor tone, nine-tenths.

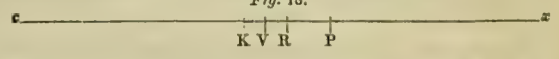
Let it be required to find a minor tone to the given note V (fig. 17), make P a major tone below V, and K a major third to P; K *x* will be a minor tone above V *x*, and will be nine-tenths of V *x*.

Fig. 17.



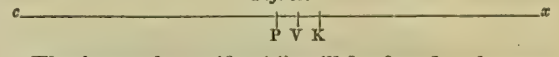
Or let V (fig. 18) be the given note, above which it is required to find a minor tone, make P a fourth to V, and K a fifth below P, and, lastly, make R a major third to K, R *x* will be a minor tone to V *x*.

Fig. 18.



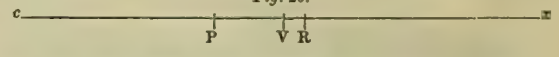
If it be required to find the minor tone below a given note V (fig. 19), make K a major tone above it, and P a major third below K; P *x* will be a minor tone below V *x*.

Fig. 19.



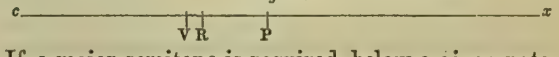
The interval E F (fig. 14) will be found to be one-sixteenth part of the distance E *x*, *viz.*, F *x* will be fifteen-sixteenths of E *x*. The interval is called a major semitone, and is the difference between a major third and a fourth, for if a major third be subtracted from a fourth the remainder will be a major semitone. Thus, let it be required to find the semitone above V (fig. 20), make P a major third below V, and R a fourth above P, R *x* will be a major semitone higher than V *x*.

Fig. 20.



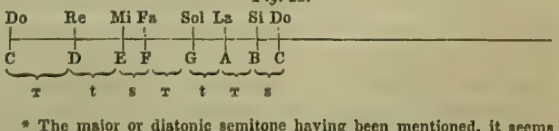
Or let V (fig. 21) be the given note, make P a fourth above V, and R a major third below P; R *x* will be a semitone higher than V *x*.

Fig. 21.



If a major semitone is required below a given note, the manner must be reversed. Let R be the given note (fig. 20), make P a fourth below R, and V a major third to P, V *x* will be a major semitone below R *x*. Or let R (fig. 21) be the given note, make P a major third to it, and V a fourth below P; V *x* will be a major semitone below R *x*.* The interval FG (fig. 14) is a major tone eight-ninths, GA a minor tone nine-tenths, AB a major tone, BC a major semitone. See fig. 22, where the major tones are marked with their usual signature T, the minor tones t, and the major semitones s.

Fig. 22.



* The major or diatonic semitone having been mentioned, it seems necessary to inform the student, that a minor or chromatic semitone (marked s) is the difference between a major semitone and a minor or major tone; as from E♭ to E♯, from C to C♯, from F to F♯, &c. There are also several other intervals resulting from the combination of many keys on the same monochord, the knowledge of which is not necessary to the student.

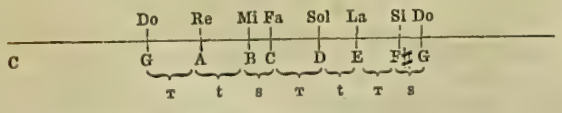
It must also be understood,—

That a major 3rd is equal to a T and a t, as CE.
... minor 3rd ... S T ... EG.
... perfect 4th ... T t s ... CF.
... perfect 5th ... T T t s ... CG.
... major 6th ... T T t t s ... CA.
... major 7th T T T t t s ... CB.
And an 8ve T T T t t s s ... CC.

The minor third DF consisting of t and s, and the fifth DA consisting of T t t s, are therefore not in tune, but are both deficient by a small interval called a comma, which is the difference between a major tone eight-ninths, and a minor tone nine-tenths, and is about as 80 to 81.*

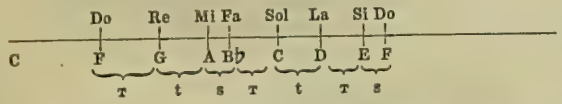
The note D combined with F or A, however, is not wanted in either of the triads Do, Fa, or Sol of the major key of C, but in the minor key of A the triad of *Fa* is D, F, and A: hence a different tuning is required in the relative minor key to that just described. But no two major keys at all *related* to each other can exist, on the same keyed instrument, perfectly in tune.† Thus the dominant key of C is G major with one sharp; G will be Do, and A Re, &c., but from Do to Re in a major key ought to be a major tone, see fig. 22; whereas in the major key of C from G to A is a minor tone. Compare figures 22 and 23, the latter of which is the major key of G.

Fig. 23.



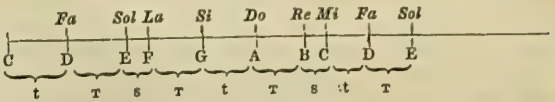
And thus in the subdominant of C, F major with one flat, from C to D, *viz.*, from Sol to La should be a minor tone, but in the major key of C, from C to D is a major tone. See fig. 24, and compare it with fig. 22.

Fig. 24.



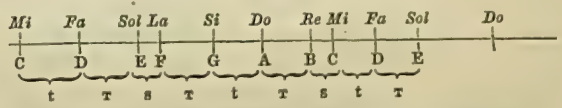
The minor key may be tuned likewise in the same way as the major, only making the thirds to *Do*, *Fa*, and *Sol*, minor instead of major. There is some difficulty, however, in choosing the first note *Do* of the principal minor key of A. Some authors make it the same as the note La of the relative major key, *viz.*, A in the key of C, a minor tone above G. In which case all the natural notes excepting D correspond with those of the major key of C. Compare figures 25 and 22.

Fig. 25.



If the major thirds to *Fa* and *Sol*, F♯ and G♯, be added to this scale, they will be different from those notes in the keys of A major. The author of the present work, therefore, prefers making the key notes of A minor and A major the same; *viz.*, a whole tone from G in the key of C major, see fig. 26, in which case only one natural note of the key of A minor, *viz.*, D, will be the same with those of the major key of C; but the key note, the fifth, and the fourth, will be the same with those of the key of A major, three sharps; as also the F♯ and G♯; and also the C♯, which is sometimes used in a close.

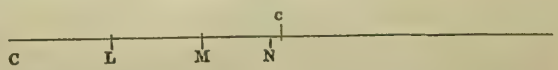
Fig. 26.



Having seen the impossibility of perfection on an instrument which has any limited number of sounds in an octave, the student may next proceed to the study of temperament, *viz.*, of the distribution of the unavoidable imperfection resulting from the limited number of sounds.

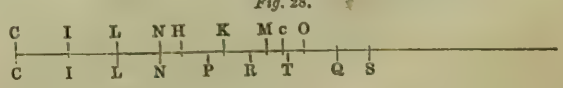
On keyed instruments containing only twelve notes in an octave, three major thirds (as CE, EG♯ or A♭, A♭C, or as GB, BD♯ or E♭, E♭G) make an octave; but three major thirds tuned perfectly to each other, as C L M N, fig. 27, fall considerably short of the true octave C. Hence in tuning, one, two, or all of the three major thirds, which constitute every octave, must be tempered too sharp; and the nearer perfection any of them are made, the worse will the others become. N C is the unavoidable imperfection which must be added either to one or more of the thirds, and if equally divided between them will, *upon the whole*, be least offensive to the ear.

Fig. 27.



Again, twelve fifths, or, which is the same thing, six major tones, on a keyed instrument, constitute an octave; but on the monochord it will be found that they exceed it by a small portion, fig. 28, where H I K L M N O P Q R S T represent twelve sounds so obtained, the latter whereof does not coincide with the true octave C: C T is the unavoidable imperfection which must be subtracted from one or more of the twelve fifths which compose an octave.

Fig. 28.



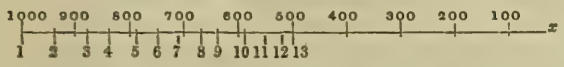
* The ratios of the monochord are generally expressed thus: the major tone $\frac{8}{9}$, minor tone $\frac{9}{10}$, major semitone $\frac{15}{16}$, &c.

† In a lecture on this subject, the author of the present work caused the keys of E major with four sharps, and E♭ major with three flats, to be tuned perfectly on the same pianoforte, *viz.*, first the triads of B E F♯, G♯, C♯, D♯. And then having two notes, G♯ and D♯ already tuned, which would serve for A♭ and E♭, C was added to them, and lastly the triads of G B♭ and D. E♭ F B♭

If equally distributed this imperfection will be scarcely perceptible; when the fifths are all equally too flat, the thirds will all become, of their own accord, equally too sharp, and this will render all keys equally imperfect, which is called the equal temperament, and may be obtained on the monochord as follows. Divide the whole string $c\ x$ into one thousand parts, beginning from right to left, as in fig. 29:

Place the note 2 at 943
... 3 ... 890
... 4 ... 840
... 5 ... 793
... 6 ... 749
... 7 ... 707
... 8 ... 667
... 9 ... 629
... 10 ... 594
... 11 ... 561
... 12 ... 529
... 13 ... 500, the true octave.

Fig. 29.



Tune any one of the twelve notes of a keyed instrument to the whole string 1 x, then 2 x will give the next note, 3 x the next, &c., to 13 x, which will be an octave to 1 x. If the note 1 x be C, then 2 x will be C♯ or D♭, 3 x will be D, 4 x will be D♯ or E♭, &c. The fifth 8 x will be only one thousandth part of the whole string too flat; but the third 5 x will be seven such parts too sharp.

Unequal temperament is that wherein some of the fifths, and consequently some of the thirds, are made more perfect than on the equal temperament, which necessarily renders others less perfect. Of this there are many systems, which the student is now capable of examining for himself.

He will also find much amusement in studying the various attempts to improve the scale by increasing the number of notes in the octave, such as that of the two additional notes at the Temple organ, of the five additional notes in Mr. Hawke's instruments, and of the twelve additional notes in those by Mr. Löeschman. In all these the bulk, expense, and complication of the instrument are increased in proportion to the number of notes added, and the consequent approach to perfection.

The author, in conclusion, cannot but regret that the preference of English organists for the old method of tuning is (as he is informed) hitherto so strong and determined, as to have resisted and repelled the attempts made to introduce the equal temperament into our Cathedrals and Churches. He has for many years uniformly recommended that this system should have a fair trial, upon the principle that as all tempered fifths and thirds offend the ear, those systems which contain such as are most tempered and most discordant cannot be preferable; especially in an age when the keys which have four sharps and three flats can no longer be excluded from general use. It has at length been fairly tried, and, having carefully examined it, he feels convinced that its practicability and superiority are as unequivocal on the organ as they are allowed to be on the piano-forte, and on all other instruments which contain only twelve different notes in each octave. He continues to press these opinions, not merely because they are his own, but because, in so doing, he is contending for the far higher authority of the judgment and practice of one whom, he trusts, his opponents must venerate and admire,—the greatest of all composers for this sacred instrument—

Sebastian Bach.

QUESTIONS

FOR THE EXAMINATION OF PUPILS,

BY

WILLIAM CROTCH, Mus. Doc.

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1 How many letters of the alphabet are used as the names of musical notes?
2 What are the names of the naturals?
3 What is a unison?
4 What is an octave?
5 What is an interval?
6 What is a semitone?
7 What is a tone?
8 What is a sharp?
9 What is a flat?
10 What is a double sharp?
11 What is a double flat?
12 How many different sounds can be produced on the organ or pianoforte, not including their octaves?*
13 What is thorough bass?
14 Which way are the figures reckoned, and from what?
15 How many, and what figures are most commonly used in thorough bass?
16 Why are the others not used?
17 What is a second, third, fourth, &c.?
18 Which note is second to A, to B, to C, &c.?
19 Which is third to A, to B, to C, &c.?†
20 What sort of scale is formed by the natural notes only?
21 How do the tones and semitones stand?
22 In what order do the notes stand?
23 What is meant by diatonic intervals?
24 What kind of octave can be played in a diatonic scale?
25 How many semitones are there in an octave?
26 How many semitones are there in a minor second?
27 How many in a major second?
28 How many in a minor third?
29 How many in a major third?
30 How many in a perfect fourth?
31 How many in an extreme sharp fourth?
32 How many in an extreme flat fifth?
33 How many in a perfect fifth?
34 How many in a minor sixth?
35 How many in a major sixth?
36 How many in a minor seventh?
37 How many in a major seventh?
38 How many in a minor ninth?
39 How many in a major ninth?‡
40 Does a diatonic scale always consist of naturals only, or may it be transposed?
41 If there is only one sharp in a diatonic scale, what sharp is it?
42 When there are more, which is the next sharp?
43 Which is the third sharp?
44 Which is the fourth sharp?
45 Which is the fifth sharp?
46 Which is the sixth sharp?
47 Which is the seventh sharp?
48 What is this order of sharps called?
49 What is the numerical order of the double sharps?
50 If one flat only is used in a diatonic scale, what flat is it?
51 If more than one, which is the second flat?
52 Which is the third flat?
53 Which is the fourth flat?
54 Which is the fifth flat?
55 Which is the sixth flat?
56 Which is the seventh flat?
57 What is the numerical order of the double flats?§
58 What is a chromatic scale?
59 Are the sharps or flats, double sharps, or double flats, of a chromatic scale, in the numerical order?
60 Are the sharps, flats, &c., placed at the beginning of a stave in any particular order?
61 Are the accidental flats and sharps, &c., always in any particular order?
62 What are chromatic intervals?
63 How many semitones are there in an extreme sharp second?
64 How many in an extreme flat third?
65 How many in an extreme flat fourth?
66 How many in an extreme sharp fifth?
67 How many in an extreme sharp sixth?
68 How many in an extreme flat seventh?
69 How many in an extreme flat octave?
70 How many in an extreme sharp octave?
71 How many in an extreme sharp ninth?‖
72 Are no others to be met with besides these?
73 What is a chromatic semitone?¶
74 What is meant by inverting an interval?
75 What does a second become when inverted?
76 What does a third become when inverted?
77 What does a fourth become when inverted?
78 What does a fifth become when inverted?
79 What does a sixth become when inverted?
80 What does a seventh become when inverted?

* Here the pupil may be required to play any given note, or all of them, and to name them when written in musical notes.

† The student may here be required to play seconds, thirds, &c., as far as ninths, to any given notes, and to point them out in music.

‡ The pupil should be able to play all these, and to know them in music.

§ The student should be able to play all the above notes, including naturals, ascending perfect fifths, beginning with F𝄫♭ and descending fifths, beginning with B♯𝄪 (or B×).

‖ The student should play them, and know them in music.

¶ The pupil should play one, and know it in music.

81 What does a minor interval become when inverted?
82 What does a major interval become?
83 What do a perfect interval and an imperfect one become?
84 What do an extreme sharp interval and an extreme flat one become?
85 What is the inversion of a minor second?
86 What is the inversion of a major second?
87 What is the inversion of an extreme sharp second?
88 What is the inversion of an extreme flat third?
89 What is the inversion of a minor third?
90 What is the inversion of a major third?
91 What is the inversion of an extreme flat fourth?
92 What is the inversion of a perfect fourth?
93 What is the inversion of an extreme sharp fourth?
94 What is the inversion of an extreme flat fifth?
95 What is the inversion of a perfect fifth?
96 What is the inversion of an extreme sharp fifth?
97 What is the inversion of a minor sixth?
98 What is the inversion of a major sixth?
99 What is the inversion of an extreme sharp sixth?
100 What is the inversion of an extreme flat seventh?
101 What is the inversion of a minor seventh?
102 What is the inversion of a major seventh?
103 What is the inversion of a perfect octave?
104 What is the inversion of a chromatic semitone?
105 What is the inversion of an extreme flat octave?
106 What is the inversion of an extreme sharp octave?
107 What is the inversion of a minor ninth?
108 What is the inversion of a major ninth?
109 What is the inversion of an extreme sharp ninth?
110 What is an enharmonic scale?
111 What are enharmonic intervals?
112 How many notes are there in a mode or key?
113 What is meant by the tonic, or do?
114 Which is the dominant, or sol?
115 Which is the subdominant, or fa?
116 Which is the mediant, or mi?
117 Which is the submediant, or la?
118 Which is the subtonic, or si?
119 Which is the supertonic, or re?
120 When is the subtonic called the leading note of the key?
121 Why are some modes called major keys, and others minor?
122 If all the intervals of a major key are reckoned upwards from the key note, what sort of intervals are they?
123 Of what sort of scale is the major key generally composed?
124 Which major key has no flats or sharps, or consists entirely of naturals?
125 Which major key has one sharp?
126 Which major key has two sharps?
127 Which major key has three sharps?
128 Which major key has four sharps?
129 Which major key has five sharps?
130 Which major key has six sharps?
131 Which major key has seven sharps?
132 Which major key has eight sharps?
133 Which major key has nine sharps?
134 Which major key has ten sharps?
135 Which major key has eleven sharps?
136 Which major key has twelve sharps?
137 Which major key has thirteen sharps?
138 Which major key has fourteen sharps?
139 Which major key has one flat?
140 Which major key has two flats?
141 Which major key has three flats?
142 Which major key has four flats?
143 Which major key has five flats?
144 Which major key has six flats?
145 Which major key has seven flats?
146 Which major key has eight flats?
147 Which major key has nine flats?
148 Which major key has ten flats?
149 Which major key has eleven flats?
150 Which major key has twelve flats?
151 Which major key has thirteen flats?
152 Which major key has fourteen flats?*
153 Which intervals of the diatonic minor key differ from those of the major?
154 In what sort of scale is the minor key generally?
155 Which notes of the minor key are frequently raised one semitone?
156 Which note is most frequently so raised?
157 Which two together?
158 Which most seldom?
159 If all three were raised, what would be the consequence?
160 What is the usual way of ascending and descending the minor key in practising them?
161 Which minor key has no flats or sharps?
162 Which minor key has one sharp?
163 Which minor key has two sharps?
164 Which minor key has three sharps?
165 Which minor key has four sharps?
166 Which minor key has five sharps?
167 Which minor key has six sharps?
168 Which minor key has seven sharps?
169 Which minor key has eight sharps?
170 Which minor key has nine sharps?
171 Which minor key has ten sharps?
172 Which minor key has eleven sharps?
173 Which minor key has twelve sharps?
174 Which minor key has thirteen sharps?
175 Which minor key has fourteen sharps?
176 Which minor key has one flat?
177 Which minor key has two flats?
178 Which minor key has three flats?
179 Which minor key has four flats?
180 Which minor key has five flats?
181 Which minor key has six flats?
182 Which minor key has seven flats?
183 Which minor key has eight flats?
184 Which minor key has nine flats?
185 Which minor key has ten flats?
186 Which minor key has eleven flats?
187 Which minor key has twelve flats?
188 Which minor key has thirteen flats?
189 Which minor key has fourteen flats?†
190 What is harmony?
191 What is a chord?
192 What is a concord?
193 What is the greatest number of notes in a concord?
194 What is a triad?
195 What is a consonant triad?
196 What is a dissonant triad?
197 How many triads are there in a diatonic scale?
198 How many of these are consonant and dissonant?
199 What is a consonant major triad?
200 What is a consonant minor triad?
201 How many consonant major triads are there in a diatonic scale?
202 How many consonant minor?‡
203 How many keys are contained in the same diatonic scale?
204 What key is the relative minor key to C major?
205 What is the relative minor key to E flat minor?

* The student should play any of these, and know them by their characteristic signatures in music.

† The student should play and know any minor key.

‡ The pupil must play and know all these in any diatonic scale.

206 What is the relative major key to D minor?* &c., &c.?
207 Do the major triads belong generally to the major or minor key?
208 Do the minor triads belong generally to the major or minor key?
209 To which bass notes of the major key do the three consonant major triads belong; or what are the Italian syllables to be written under them?
210 To which bass note of the minor key do the three consonant minor triads belong; or what are the Italian syllables to be written under them, and how are they to be distinguished from those of the minor key in writing them?
211 Are the triads of the minor key always minor triads?
212 Which is most frequently made major?
213 Which two together?
214 Which is most seldom major?
215 What is it called?
216 What would be the consequence of making all the three triads major?
217 In ascertaining the key of any piece of music, or the keys through which it modulates, what is first to be done?
218 How is the leading note known from any other in the passage?
219 How does the leading note point out the key note?
220 How is the key known to be major or minor?
221 How is the key to be known when there are chromatic passages in the melody?
222 If the chords are chromatic, how can the key be known?†
223 What is the first and most strict rule in composition, and in playing thorough bass?
224 What is the second rule?
225 In thorough bass, are the figures of the triad $\frac{5}{3}$ always written when they are to be played?
226 What figures in thorough bass stand for the triad?
227 What note may be played in the right hand besides the $\frac{5}{3}$?
228 In what part of the instrument should the right hand be placed for the first triad of a succession?
229 Which note should be at the top?
230 If the triad were written in score, what difference would there be between their situation and that when played in thorough bass?
231 In playing a succession of triads, how many ways are there of passing from one triad to another without making consecutive fifths or octaves?
232 Which is the best of these ways?
233 When may that which is not best be used?
234 If the upper melody cannot remain on (or repeat) the same note, to which note should it go?
235 If one note is not nearer than the other, to which should it go?
236 If the bass moves a fifth, a third, or a second, in a succession of triads, should the treble (if it cannot remain on the same note) move the same way as the bass, or the contrary?
237 If the bass moves a fourth, a sixth, or a seventh, should the treble move the same way, or the contrary, if it cannot stand still?
238 What note should follow the leading note?
239 If the key changes after the leading note is played, what note should it go to?
240 When is the triad said to be direct?
241 Which note of the triad should not generally be omitted?

* The pupil must know the relative key to any given major or minor key.

† The student should here point out all the keys in any given piece of music; but the less chromatic the better.

242 Which should not be generally doubled?‡
243 When a sharp, flat, &c., is placed over a note in thorough bass, what does it signify, and how are other figures made sharp?
244 What is meant by the inversion of a triad?
245 Which is the first inversion?
246 Which is the second inversion?
247 When a 6 is written in thorough bass, what does it stand for? what other notes should be played, and which should be avoided?
248 Why should this note be avoided?§
249 Is the $\frac{8}{3}$ always an inversion of the triads, do, fa, and sol, of the major or minor key?
250 Are the sixths on the second note of the key, and on the fourth note of the key, inversions of these, or not?
251 How may they be accompanied?
252 In a succession of sixes, should the third or the sixth generally be in the upper melody, and why?‖
253 What note should be played when $\frac{6}{4}$ is written?
254 Is the $\frac{6}{4}$ always the inversion of the triads, do, fa, or sol?
255 Is the $\frac{6}{4}$ often used as the inversion of a triad in composition?
256 Is the $\frac{6}{4}$ on the fourth note of the key an inversion of a consonant triad, or not?
257 How should it be played?
258 Is the $\frac{6}{4}$ on sol, the fifth note of the key, accented, and followed by $\frac{5}{3}$ on the same bass note, an inversion of the triad of do, or not?
259 What is it then?
260 How must the notes of the $\frac{6}{4}$ be followed by those of the $\frac{5}{3}$?
261 Which of the three triads, do, fa, or sol, is very seldom, if ever, inverted as a $\frac{6}{4}$?
262 What is a close or cadence?
263 What is a full close or perfect cadence?
264 What triad generally goes before it?
265 What sort of triad must sol be in all closes, whether in the major or minor key?
266 What sort of triad was do in the minor key after fa, in old church music?
267 What is a half close or imperfect cadence?
268 What is a deceptive close or cadence?
269 What is the close delayed, or false, flying, interrupted, or abrupt cadence?
270 How are do in the minor key and fa in the major key, in the close delayed, the same thing?¶
271 What is a discord?
272 Which is the discordant note?
273 How is a discord resolved?
274 Why are discords of addition so called?
275 What is the dominant seventh, or discord of sol?
276 What sort of third, of fifth, and of seventh, must it always have?
277 If a 7 is written in thorough bass, what does it stand for?
278 May an 8 be added to this?
279 Do the figures $\frac{7}{5}$ and $\frac{7}{3}$ stand for $\frac{7}{5}$ generally?
280 Into what triad in the same key is the dominant seventh resolved, or what is the usual way of resolving the dominant seventh?
281 What must become of fa, the discordant note?
282 What must become of si, the leading note?

‡ The student should now play the accompaniments of a diatonic succession of triads in thorough bass, and write them in score; using the clefs necessary, and transposing them into other keys.

§ The student should play and write the score of these from a given bass, in various keys.

‖ The student should play and write the score of these from a given bass, in various keys.

¶ Examples of these should be played and scored, as above.

283 To what must the bass note sol generally move?
284 What generally becomes of sol in the treble?
285 To what does re generally go, and why?
286 Which notes of the dominant seventh $\frac{8}{7}_{5}_{3}$ are most frequently, and which is very seldom, omitted by composers?
287 Into which triad of the relative minor key is the dominant seventh of the major key sometimes resolved?
288 Into which triad of the relative major key is the dominant seventh of the minor key sometimes resolved?
289 Are these the only resolutions of the dominant seventh?*
290 How many inversions of the dominant seventh are there, and what are their figures?
291 Which notes of the $\frac{6}{5}_{3}$ are frequently omitted by composers?
292 If the sixth is omitted, what sort of triad remains?
293 In playing thorough bass, what does $\frac{6}{5}$ generally stand for?
294 Which note of the $\frac{6}{4}_{3}$, on the second note of the key, is generally omitted by the classical composers?
295 What does $\frac{4}{3}$ generally stand for?
296 In playing thorough bass, what does $\frac{4}{2}$ generally stand for?
297 Which is the discordant note in $\frac{6}{4}_{2}$?†
298 Which is the added sixth, or discord of fa?
299 Which is the discordant note?
300 Into what triad of the same key is this discord generally resolved?
301 Into what discord is it frequently resolved?
302 What is the only rule necessary to be observed in this resolution?
303 When composers omit the fifth note of this discord, what triad does the remaining $\frac{6}{3}$ on the bass note resemble?
304 How is this or any other doubtful chord to be determined?
305 Is fa with a $\frac{6}{3}$ the inversion of a triad, or not?
306 May an 8 be played with it, or not?
307 What does fa with a $\frac{6}{3}$ in the minor key resemble?
308 What are the inversions of fa with a $\frac{6}{3}$ in the major key?
309 What are the inversions of fa with a $\frac{6}{3}$ in the minor key?
310 Is the $\frac{6}{4}$ often used as an inversion of fa with a $\frac{6}{3}$?
311 How should the dissonant triad in the major key be accompanied?
312 How many dissonant triads are there in the minor key, and from what are they derived?‡
313 What is the added ninth, or double discord of sol?
314 Which note should generally be at the top, or which note of the accompaniment must not be placed above the ninth?
315 Which note is most frequently omitted?
316 How is this discord resolved?
317 What is the other way of resolving it?
318 Which other notes may be omitted?
319 What is the leading seventh, and from what is it derived?
320 What is the diminished seventh?
321 How is it resolved?

* The student should play from a figured bass, and put into score the resolutions and omissions of the dominant seventh, in various keys.

† The student should play from a given bass all the inversions and omissions of the dominant seventh, and make scores of them, transposing them into various keys.

‡ All these should be played and scored in various keys.

322 What is the other way of resolving it?
323 Is the leading seventh in the major key ever inverted, and as what?
324 Which note should be at the top?
325 Is the diminished seventh ever inverted, and as what?
326 If the $\frac{6}{5}_{3}$ is used on re, the second note of the key, which note should be at the top?§
327 Why are discords of suspension, or prepared discords, so called?
328 Are they accented, or unaccented, and what does that mean?
329 How are they accompanied?
330 How are they prepared?
331 When a 4 is resolved into a 3, how is it accompanied, and how prepared?
332 What is the most usual inversion of this discord?‖
333 When a 9 is resolved into an 8, how is it accompanied, and how prepared?
334 Is it ever inverted?
335 When a 7 is resolved into a 6, how is it accompanied?
336 Is it ever inverted?
337 When does a $\frac{6}{5}$ not stand for $\frac{6}{5}_{3}$?
338 Are these resolutions of the 4 into 3, the 9 into 8, &c., invariable?
339 Must a 7 resolved into a 6 never be accompanied with a 5?
340 When 5 followed by 6 occurs on each bass note as the bass ascends, how must it be accompanied?
341 When $\frac{7}{5}$ is resolved into $\frac{6}{5}$ on fa, how may it be accompanied, and how prepared?
342 Is this always prepared?
343 Does the 7 always fall to 6 on the same bass note?
344 May discords of addition be prepared like those of suspension?
345 Which notes in the bass are frequently sustained or held on as a drone or pedal note on the organ?
346 What should in general be played when $\frac{8}{6}$ are written in thorough bass?
347 When $\frac{7}{6}$ are followed by $\frac{7}{5}$, and $\frac{6}{5}$ by $\frac{6}{4}$, &c., on the same bass note, what should be played with them?
348 What are double discords?
349 How is the $\frac{9}{4}$ accompanied, and how is it resolved?
350 How is the $\frac{9}{7}$ accompanied, and how is it resolved?
351 Must double discords be prepared?
352 How is $\frac{9}{7}_{4}$ on mi, the third note of the key, prepared and resolved?
353 How is $\frac{7}{4}_{2}$ or $\frac{9}{7}_{4}$ on the key note resolved, and is it always prepared?
354 What are discords of transition?
355 Are they accented or unaccented?
356 When $\frac{8}{5}_{3}$ is followed by $\frac{7}{5}_{3}$ on the same bass note, what must the 7 do?
357 Are all passing notes discordant notes?
358 When a $\frac{5}{3}$ is followed by a sixth on the same bass note, which way must the sixth generally move?
359 When $\frac{6}{3}$ is followed by 5 on the same bass note, which way must the 5 move afterwards?
360 What is meant by dashes over notes in the bass?
361 Are dashes always placed over notes of this kind?
362 Is the $\frac{4}{2}$, preceded and followed by $\frac{5}{3}$, to ascend or descend?
363 When $\frac{4}{2}$ is a discord of transition, on a holding note in the bass, how may it be accompanied?

§ Examples of the foregoing discords should be played and scored.

‖ Examples should be played and put into score, and so of all other discords to the end.

364 How is this $\frac{4}{2}$ to be distinguished from the $\frac{6}{4}$ or discord of fa inverted, and often written as $\frac{4}{2}$?
365 What are discords of syncopation?
366 Must they be prepared?
367 What inversions of this succession of sevenths, or alternate bass notes, are used?
368 What is chromatic harmony?
369 What are chromatic passing notes?
370 Which note of the bass is often raised one semitone without changing the key?
371 Which notes of the major key are often flattened?
372 On which bass notes may the diminished seventh be used?
373 How is the Italian extreme sharp sixth accompanied?
374 How is the German?
375 How is the French?
376 What is the Neapolitan sixth?
377 Are there any other chromatic discords?
378 What is counterpoint, and what is plain and florid counterpoint?
379 What is melody?
380 What are essential and unessential notes?
381 What are passing notes?
382 What are appoggiaturas?
383 May passing notes and appoggiaturas be chromatic?
384 When are appoggiaturas generally made chromatic?
385 What are adjunct notes?
386 When are they generally chromatic?
387 What are notes of anticipation?
388 What is modulation?
389 What is diatonic modulation?
390 What is chromatic modulation?
391 What is enharmonic modulation?
392 What is natural or relative modulation?
393 What is unnatural or extraneous modulation?
394 What is gradual modulation?
395 What is sudden modulation?
396 What is transient modulation?

ANSWERS

TO

QUESTIONS FOR THE EXAMINATION OF PUPILS,

BY

WILLIAM CROTCH, Mus. Doc.

1 Seven.
2 A, B, C, D, E, F, G, then A again, &c.
3 When two or more voices or instruments sound the same note exactly.
4 The next note of the same name, above or below any note.
5 The difference of sound between any two notes.
6 The smallest interval on a pianoforte.
7 Two semitones.
8 The note which is one semitone higher than the natural of the same name.
9 The note which is one semitone lower.
10 The note which is two semitones or one tone higher.
11 The note which is two semitones or one tone lower.
12 Twelve.
13 Playing the accompaniment to a bass with figures.
14 Upwards, from the bass note.
15 2, 3, 4, 5, 6, 7, 8, and 9.
16 1 is not used, because it is a unison, and therefore the same as the bass; 10, 11, &c., are not used, because they are double figures.
17 A second is the next note above the bass, or the octave or double octave above the second; a third is the third note, or its octave or double octave, and so of the rest.
18 The second to A is B, to B is C, &c., &c.
19 The third to A is C, to B is D, &c., &c., &c.
20 A diatonic scale.
21 Two tones and a semitone, three tones and a semitone, and then two again, &c.
22 In the alphabetical order.
23 Such as are found in a diatonic scale.
24 The perfect octave.
25 Twelve semitones.
26 One semitone.
27 Two semitones.
28 Three.
29 Four.
30 Five.
31 Six.
32 Six.
33 Seven.
34 Eight.
35 Nine.
36 Ten.
37 Eleven.
38 Thirteen.
39 Fourteen.
40 A diatonic scale may have one, two, or any number of flats or sharps; but all diatonic scales resemble that formed by naturals.
41 F sharp.
42 C sharp.
43 G sharp.
44 D sharp.
45 A sharp.
46 E sharp.
47 B sharp.
48 The numerical order.
49 The same as that of the sharps, F, C, G, D, A, E, B.
50 B flat.
51 E flat.
52 A flat.
53 D flat.
54 G flat.
55 C flat.
56 F flat.
57 The same as that of the flats, B, E, A, D, G, C, F.

58 One which differs from the diatonic, but can be played on the pianoforte.
59 No.
60 Yes, in the numerical order.
61 No, sometimes in the numerical order and sometimes not, according as the piece is diatonic or chromatic.
62 Such as are not found in a diatonic scale, but in the chromatic.
63 Three.
64 Two.
65 Four.
66 Eight.
67 Ten.
68 Nine.
69 Eleven.
70 Thirteen.
71 Fifteen.
72 Other chromatic intervals, as the extreme sharp third, may be met with; but very rarely, and not in thorough bass.
73 A chromatic semitone is composed of two notes, represented by the same letter, as from A natural to A sharp; not in the alphabetical order, as from A natural to B flat.
74 To invert an interval, is to alter the relative position of the two notes, making the lowest highest.
75 A seventh.
76 A sixth.
77 A fifth.
78 A fourth.
79 A third.
80 A second.
81 A major.
82 A minor.
83 A perfect interval when inverted becomes another perfect interval, and an imperfect one becomes another not perfect.
84 An extreme sharp interval becomes an extreme flat one, and the reverse.
85 A major seventh.
86 A minor seventh.
87 An extreme flat seventh.
88 An extreme sharp sixth.
89 A major sixth.
90 A minor sixth.
91 An extreme sharp fifth.
92 A perfect fifth.
93 An extreme flat fifth.
94 An extreme sharp fourth.
95 A perfect fourth.
96 An extreme flat fourth.
97 A major third.
98 A minor third.
99 An extreme flat third.
100 An extreme sharp second.
101 A major second.
102 A minor second.
103 (No inversion) a perfect octave.
104 An extreme flat octave.
105 A chromatic semitone.
106 An extreme flat octave.
107 A major seventh.
108 A minor seventh.
109 An extreme flat seventh.
110 One which requires smaller intervals than semitones, and cannot therefore be performed on a pianoforte without repeating the same notes.
111 Such as are peculiar to the enharmonic scale.
112 Seven; the key note, the second, third, fourth, fifth, sixth, and seventh.
113 The key note.
114 The fifth note.
115 The fourth note, or fifth below the key note.
116 The third note, or middle note between the tonic and dominant.
117 The sixth note, or third below the key note, or middle note between the key note and its fifth below, or subdominant.
118 The seventh note, or note below the tonic.
119 The second note, or note above the tonic.
120 When it is one semitone below it.
121 Because the third note is a major third to the key note in a major key, and a minor third in a minor key: the key is said to be major or minor according as its third is major or minor.
122 They are perfect and major: there are no imperfect or minor intervals.
123 A diatonic scale.
124 C natural.
125 G natural.
126 D natural.
127 A natural.
128 E natural.
129 B natural.
130 F sharp.
131 C sharp.
132 G sharp.
133 D sharp.
134 A sharp.
135 E sharp.
136 B sharp.
137 F double sharp.
138 C double sharp.
139 F natural.
140 B flat.
141 E flat.
142 A flat.
143 D flat.
144 G flat.
145 C flat.
146 F flat.
147 B double flat.
148 E double flat.
149 A double flat.
150 D double flat.
151 G double flat.
152 C double flat.
153 The third, sixth, and seventh are minor in the minor key; but the second is major, and the fourth and fifth perfect, as in the major key.
154 In the chromatic scale.
155 The third, sixth, and seventh.
156 The seventh note.
157 The sixth and seventh.
158 The third.
159 The key would become major.
160 In ascending, the sixth and seventh notes are raised one semitone; in descending, they are restored to minor intervals and the scale is diatonic.
161 A natural.
162 E natural.
163 B natural.
164 F sharp.
165 C sharp.
166 G sharp.
167 D sharp.
168 A sharp.
169 E sharp.
170 B sharp.
171 F double sharp.
172 C double sharp.
173 G double sharp.
174 D double sharp.
175 A double sharp.
176 D natural.
177 G natural.
178 C natural.
179 F natural.
180 B flat.
181 E flat.

182 A flat.
183 D flat.
184 G flat.
185 C flat.
186 F flat.
187 B double flat.
188 E double flat.
189 A double flat.
190 A succession of chords.
191 A coincidence of sounds.
192 A chord in which no two notes are next to each other in alphabetical order, and in which there is no extreme flat or extreme sharp interval.
193 Three.
194 Any note accompanied with its third and fifth.
195 One in which the fifth is perfect.
196 One in which the fifth is not perfect.
197 Seven.
198 Six consonant and one dissonant.
199 One in which the fifth is perfect and the third major.
200 One in which the fifth is perfect and the third minor.
201 Three.
202 Three.
203 Two; one major and one diatonic minor.
204 A minor.
205 C minor.
206 F major, &c., &c.
207 To the major key.
208 To the minor key.
209 They belong to the tonic or key note, to the subdominant or fourth, and to the dominant or fifth; and the syllables, *do*, *fa*, and *sol*, are to be written respectively under them.
210 They belong to the same notes in the minor key; and the syllables, *do*, *fa*, and *sol*, are to be written with dashes under them, to distinguish the minor from the major key.
211 No; when the third, sixth, or seventh notes are raised one semitone, they make the triads, *do*, *fa*, and *sol*, respectively major triads.
212 The triad of *sol*.
213 *Fa* and *sol*.
214 *Do*; for a minor key is generally called so from its third being minor.
215 The tierce de Picardie.
216 The key would become major.
217 The leading note should be sought for.
218 It is the last of the double sharps, if there are any; or if there are no double sharps, it is the last of the sharps; or if no sharps, the last of the naturals; according to the numerical order: but it is only found amongst flats, in keys which have seven or more flats, and then it is the last flat.
219 The leading note is always a diatonic semitone or minor second below the key note.
220 If the third or sixth is minor, the key is minor; otherwise major.
221 By a reference to the chords; and if these are not chromatic, there will be little difficulty.
222 If the chords are chromatic, the key must be determined by the chords which follow them.
223 Two consecutive perfect fifths must not take place between the same parts.
224 Two consecutive perfect octaves must not take place between the same parts.
225 When no figures are placed over the accented or principal notes of a bar in the bass, the triad to that bass note is to be played: except the words "tasto solo" are put, which signify that no chords are understood; or when a dash is put, which signifies that the last chord is to be repeated or held on.
226 $\frac{8}{5}$ or any two of these alone.
227 Generally an 8.
228 On the stave of the treble clef, avoiding ledger lines, those above the stave especially.
229 It is immaterial whether the 8, the 5, or the 3, is at the top in the first triad.
230 In score, the several notes must be placed within the compass of the voices or instruments required to perform them, whether they can be reached by the hand on the pianoforte or not.
231 There is one wrong way which occasions a succession of fifths and octaves, and two other ways which are allowable.
232 The best way of the two is that which occasions the least possible motion to the right hand, and especially to the upper melody.
233 When the right hand is already too low or too high, that which is not best may be used to recover its position.
234 To the nearest.
235 To that which occasions the least motion of the right hand upon the whole.
236 It should move in a contrary direction.
237 It should move the same way.
238 The leading note should be succeeded by the key note.
239 To the note that would have been the key note if the key had not changed; or, in other words, to the nearest note.
240 When the triad is played as a $\frac{5}{3}$ to the bass note, it is said to be direct; or when the note by which the triad is upheld is in the bass.
241 The third note of the triad should not be omitted.
242 The third note should not be doubled.
243 When a sharp, flat, or natural, is placed over a bass note, it signifies that the third is to be respectively sharp, flat, or natural; but when placed before any figure, it sharpens that figure: a dash across a 6 or 4 sharpens them.
244 A triad is inverted, when the third or the fifth is made the bass note.
245 When the third is made the bass note and the figures become $\frac{6}{3}$, written 6.
246 When the fifth is made the bass note, and the figures are $\frac{6}{4}$.
247 A 6 stands for $\frac{6}{3}$; another 6, or another 3, may be added, but not an 8.
248 The 8 doubles the bass note, and the bass note is the third note of the triad in its direct state, which should not be doubled.
249 No.
250 They are not inversions.
251 They may generally have an 8.
252 The sixth note should generally be at the top, or there will be consecutive perfect fifths.
253 $\frac{6}{4}$ stands for $\frac{8}{6}$, generally.
254 The $\frac{6}{4}$ is not always an inversion.
255 It is very seldom used as such.
256 It is the inversion of a dissonant triad.
257 The 8 should be generally omitted.
258 It sounds like the triad of do inverted; but it is not.
259 It is a double appoggiatura on sol, and sol should be written under it.
260 The 6 should be followed by the 5, and the 4 by the 3.
261 The triad of sol is very seldom inverted as a $\frac{6}{4}$ in any key, major or minor.
262 A close or cadence is the termination of a passage with two or more triads.
263 When the passage ends with the triad of do after sol or fa in the same key.
264 The triad of sol generally precedes it; fa, do, is peculiar to church music.

265 The triad of sol must be major, both in the major and minor keys, in all closes or cadences.
266 Do was a major triad, called the tierce de Picardie.
267 A half close is when the passage ends with sol after do or fa in the same key.
268 When the passage ends with fa after do or sol in the same key.
269 When the passage ends with *do* in the minor key, after do, fa, or sol, in the major key; or when it ends with fa in the major key, after *do*, *fa*, or *sol*, in the minor key.
270 *Do* in the minor key is the note above sol in the major, and fa in the major key is the note above *sol* in the minor key.
271 A chord in which two notes are next to each other in alphabetical order (including G, A, there being no H); or one in which there is an extreme sharp or extreme flat interval.
272 The lowest of the two in alphabetical order.
273 The discordant note must fall to the note below it in the same key.
274 Discords of addition are so called because the composer may form them by adding a note to other chords when he pleases, without preparing them.
275 The dominant seventh is the $\frac{7}{5}_{3}$, or sol.
276 The third is major, the fifth perfect, and the seventh minor, in the dominant seventh, whether in the major or minor key.
277 7 generally stands for $\frac{7}{5}_{3}$.
278 An 8 may be occasionally added.
279 $\frac{7}{5}$ and $\frac{7}{3}$ may often stand for $\frac{7}{5}_{3}$; but as there are instances in which this is not the case, it is better to add no figure.
280 Into the triad of do.
281 The discordant note must fall to mi.
282 It must rise to the key note.
283 Sol in the bass usually goes to do, sometimes it remains on sol, but very seldom goes to mi, as that would double the third, to which the discordant note must fall.
284 Sol in the treble stands still.
285 Re goes to do, to avoid consecutive perfect fifths to the bass, when that goes to do, and to avoid doubling mi, the third note of the triad of do, to which the discordant note must fall.
286 The 8 and the 5 are frequently omitted, and the third seldom.
287 Into *do* minor.
288 Into fa major [which has been shown to be similar, Answer 270].
289 There are others, but they are seldom used.
290 Three; the $\frac{6}{5}_{3}$ on si the leading note, the $\frac{6}{4}_{3}$ on re the second of the key, and $\frac{6}{4}_{2}$ on fa the fourth of the key.
291 The 3 and the 6.
292 A dissonant triad.
293 $\frac{6}{5}$ generally stands for $\frac{6}{5}_{3}$
294 The fourth is generally omitted.
295 $\frac{4}{3}$ generally stands for $\frac{6}{4}_{3}$.
296 $\frac{4}{2}$ generally stands for $\frac{6}{4}_{2}$.
297 The bass note.
298 A sixth added to the $\frac{5}{3}$ making $\frac{6}{5}_{3}$ on fa.
299 The fifth.
300 Into the triad of sol.
301 Into the dominant seventh.
302 The discordant note must fall.
303 It resembles the triad of *fa* in the relative minor key.
304 By the chords which follow.
305 It is not an inversion.
306 It may be played with it.
307 It resembles the dissonant triad, derived from the dominant seventh in the major key [see Answer 292].
308 A $\frac{6}{4}_{3}$ on la and a $\frac{5}{3}$ on re.
309 A $\frac{6}{4}_{3}$ on *la* and a $\frac{5}{3}$ (dissonant triad) on *re*.
310 The $\frac{6}{4}_{2}$ on la, as an inversion of fa with a 6, is seldom used in any key.
311 There should be no 8 in the right hand, as it would double the bass note, which is the third note of the dominant seventh.
312 There is a dissonant triad on the second note of the minor key, *re*, and another on the leading note of the key; the former is derived from *fa* with a sixth, the latter from the dominant seventh.
313 The added ninth is a ninth added to the dominant seventh; it is a major ninth in the major key, and a minor ninth in the minor key.
314 The ninth should generally be at the top, and the third should never be above it; but the seventh or fifth may occasionally be at the top.
315 The fifth.
316 The ninth may fall to the eighth; then the chord becomes the dominant seventh, and is resolved accordingly into the triad of do.
317 The discord may be resolved immediately into the triad of do; but it is generally do inverted as a $\frac{6}{4}_{3}$.
318 The third may be omitted, and the bass note very frequently; but it then becomes another discord.
319 The leading seventh is so called because it is a $\frac{7}{5}_{3}$ on the leading note of the key; it is derived from the $\frac{9}{7}_{5}_{3}$ on sol, the bass note being omitted.
320 The diminished seventh or a minor third, extreme flat fifth, and extreme flat seventh, is the leading seventh in the minor key.
321 The 7 falls to 6 and becomes the dominant seventh inverted as a $\frac{6}{5}_{3}$, which resolves into the triad of do.
322 It may be resolved immediately into the triad of do.
323 It may be inverted as a $\frac{6}{4}_{3}$ on fa.
324 The third note should be at the top, as that was the ninth in the discord from which it is derived. [Answer 314.]
325 The diminished seventh may be inverted as a $\frac{\sharp 6}{5}_{3}$ on *re*, a $\frac{\sharp 6}{\sharp 4}_{3}$ on *fa*, or a $\frac{6}{\sharp 4}_{\sharp 2}$ on *la*.
326 The 5 should be at the top [see Answers 324 and 314], or always above the sixth.
327 Discords of suspension, or prepared discords, are so called, because the discordant note is a note of the preceding chord continued: or, a discord of this kind is prepared by the discordant note being so contained in the preceding chord in the same part.
328 Discords of suspension are accented. In beating time, the hand falls on the accented notes, and rises on those that are unaccented. If there are four chords in a bar, the first is accented and the third: if there are three in a bar, the first is accented.
329 The same notes are to be played with the discord as would be played with the chord that follows.
330 The discordant note must be in the same part as in the preceding chord.
331 The 4 must be accompanied with $\frac{5}{3}$, because they are the notes which would be played with the third which follows: the $\frac{5}{3}$ may be held, instead of struck again. The fourth is the discordant note, which must be prepared or sustained from the same note in the preceding chord.

332 The $\frac{5}{2}$, which must not have an 8; the bass note falls, and must be prepared; the $\frac{7}{4}$ is seldom used, because it resolves into $\frac{6}{4}$; the 7 is the discordant note, which must be prepared.

333 The 9 must be accompanied with $\frac{5}{3}$, and the 9 is the discordant note (not the bass note), and must be prepared.

334 The ninth never is inverted.

335 It is accompanied with a third only.

336 In a succession it cannot be inverted; but by itself it may; as a $\frac{6}{5}$ followed by $\frac{6}{4}$.

337 When a $\frac{6}{5}$ is followed by a $\frac{6}{4}$, the $\frac{6}{5}$ does not stand for $\frac{6}{5}$, as in former discords, but may have an 8 played with it.

338 These are the most common; but sometimes the bass note alters when the discord is resolving.

339 A 5 is sometimes added; but must not remain; and, as in many cases it does not sound well, it is better omitted in thorough bass.

340 With a third only. If a fourth part is wanted, it may consist of a third and an eighth alternately.

341 With a third: the seventh is the discordant note, which should be prepared.

342 No.

343 Sometimes the bass removes.

344 Any discord of addition may be prepared like those of suspension; but the difference is, that they need not be prepared, while discords of suspension must be.

345 Sol and do frequently; fa very seldom.

346 $\frac{8}{6}$ implies that nothing else should be played. The fourth is generally understood, but should not be played.

347 An eighth may be played with them.

348 Double discords are two discordant notes resolved at the same time.

349 The $\frac{9}{4}$ may generally have a 5: the 9 falls to 8, and the 4 to 3.

350 The $\frac{9}{7}$ may have a 3: 9 falls to 8, and 7 to 6.

351 Both discordant notes must be prepared.

352 All the three notes must be prepared and resolved by each falling to the note below.

353 The 7 is the leading note, and rises to the key-note; the fourth falls; and the 9 or 2 goes to 8: but this is not always a discord of suspension.

354 Discords of transition are notes which ascend or descend diatonically, like passing notes, while one or more other notes remain fixed.

355 They are unaccented.

356 The seventh must fall to the note below in the next chord.

357 No.

358 The sixth must ascend to the note above in the next chord.

359 It must fall to the note below in the next chord.

360 They imply that the bass note is the passing note, and that no new chord is to be played with it.

361 Dashes are not used by all composers in thorough bass.

362 If the 4 was preceded by 3, and the 2 by 8, it must rise to the $\frac{5}{3}$; but it the 4 was preceded by 5, and the 2 by 3, it must fall. $\frac{4}{2}$ are passing notes, which may sometimes ascend and sometimes descend.

363 Not with a 6: a fifth may generally be added, or an eighth.

364 In this discord the bass stands still; but, when the bass note falls, it is a discord of another kind, and may have a sixth added.

365 A succession of sevenths, accompanied with $\frac{8}{5}$, or $\frac{5}{3}$, or $\frac{8}{3}$ only, as circumstances require. The sevenths are placed on every bass note, or on the alternate bass notes, the bass falling fifths.

366 Yes.

367 The $\frac{6}{5}$ and the $\frac{6}{4}$ which is often written $\frac{4}{2}$.

368 When the notes of a chord are raised or flattened without altering the key, the harmony is chromatic.

369 Chromatic passing notes are sometimes figured in the harmony. They are notes which ascend or descend through semitones formed by notes not contained in the diatonic scale.

370 Fa, the fourth note of the key, is often raised one semitone, and is then called fa sharp.

371 The sixth and seventh.

372 The diminished seventh may be used on the leading note of any key, major or minor, and also on fa sharp. (370.)

373 With a third only.

374 With a $\frac{5}{3}$.

375 With a $\frac{4}{3}$.

376 A minor sixth and minor third on fa, in any key, major or minor.

377 There are many other chromatic discords.

378 Counterpoint is only another word for harmony or writing notes over the bass. When the notes of the bass and of the accompaniment are of the same length, it is plain counterpoint; but when they differ in length, it is florid counterpoint.

379 Melody is a succession of single notes, or the notes of the treble, tenor, bass, or any other part.

380 Essential notes are those which are usually figured in thorough bass; unessential notes are those notes in the bass which have no accompaniment, or those in the accompaniment which do not belong to the harmony or thorough bass.

381 Passing notes (sometimes figured as discords of transition) are notes ascending or descending diatonically from one essential note to another.

382 Appoggiaturas (sometimes figured as discords of suspension) are accented notes placed above or below the essential notes which follow them.

383 They may.

384 When placed below the essential notes.

385 They are unaccented notes placed above or below the essential notes.

386 When placed below the essential notes.

387 They are notes which can only be accounted for by supposing them to belong to the chord which follows.

388 Change of key.

389 Passing from the major to the relative diatonic minor key, or the reverse, without changing the flats or sharps.

390 Chromatic modulation is when the key is changed by altering the flats or sharps.

391 When one note is substituted for another of the same sound on a pianoforte.

392 Going into those keys which are most nearly related to the first key: these are the relative, the dominant key and its relative, and the subdominant key and its relative; or, in other words, going into the relative key and into those which have one sharp or flat more or less than the first key.

393 Any other modulation is extraneous; as when two or more sharps or flats are added.

394 Gradual modulation is effected by doubtful chords, or chords which may belong both to the first key and to that into which the modulation is made.

395 Sudden modulation is where the transition from key to key is plainly distinguishable.

396 Transient modulation is such as is of very short duration.

END.

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THE HISTORY OF MUSICAL PITCH.

142
mp.

BY ALEXANDER J. ELLIS, B.A., F.R.S., F.S.A.,

TRANSLATOR OF PROF. HELMHOLTZ'S "SENSATIONS OF TONE."

Reprinted, with Corrections and an Appendix, from the "Journal of the Society of Arts" for 5 March and 2 April 1880. An abstract by the Author appeared in "Nature," 8 April 1880, pp. 550-554.

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ON

THE HISTORY OF MUSICAL PITCH.

BY

ALEXANDER J. ELLIS, B.A., F.R.S., F.S.A.

A Paper read before the Society of Arts, 3 March 1880, WILLIAM POLE, Esq., Mus.D., F.R.S., *in the chair.*

(FOR TABLE OF CONTENTS SEE LAST PAGE.)

Art. 1. *Introduction.*—On 22 May 1877, I read a paper in this room on "The Measurement and Settlement of Musical Pitch," for which the Society of Arts honoured me with one of their silver medals. Subsequently, it was objected that the instrument which I used for measuring pitch (Appunn's tonometer, see p. 300) gave results differing considerably from those obtained by other observers, and was, therefore, probably incorrect. It was also objected that I had not given a sufficient account of early musical pitch. I have been able to discover the cause of the error of Appunn's instrument and its correction, and I have been fortunate enough to obtain a large amount of new information respecting early musical pitch. To arrive at these results has been a work of time, labour, and expense, far beyond what I could have anticipated, and I should never have obtained them at all without the co-operation of numerous friends and assistants, to whom I beg hereby to tender my most hearty thanks.[1] This must be my apology for the length of time that has elapsed between the reading of my first paper and its present correction and supplement, which, however, I have endeavoured to make complete in itself.

Art. 2. *Pitch.*—By the pitch of a musical note I shall always mean, as is usual in England, "the number of double or complete vibrations, back-

[1] *List of my Principal Helpers.*—The following is a nominal list of the 107 public bodies and persons to whom I am principally indebted for assistance. The eleven to whose names a star * is prefixed have helped me very much indeed, several of them to an extent for which I cannot sufficiently thank them.

2 *Public Bodies.*—The Lords of the Committee of Council on Education, Science and Art Department; the Society of Arts.

10 *Professors.*—W. G. Adams, of King's-college, London; Cornu, of Paris; F. Guthrie, of the Science Schools, London; *Herbert McLeod, of Cooper's-hill College, Staines; *Alfred Mayer, of Stevens Institute, Hoboken, New Jersey, U.S.; Sir Herbert Oakeley, of Edinburgh; Rev. Sir F. A. Gore Ouseley, Bart., of Oxford; *F. Rossetti, of Padua; Sir R. Stewart, of Dublin; J. Tyndall, of the Royal Institution.

11 *Private Gentlemen and Ladies.*—Herr Amels, formerly of Crefeld; R. Drew, Esq., of Dublin; Rev. G. T. Driffield, rector of Bow; Mr. George Herbert; M. Philbert, when Consul at Amsterdam; Rev. H. R. Haweis; Dr. Huggins, F.R.S.; *Frau Näke, of Dresden; the family and descendants of the late J. H. Scheibler, in Crefeld; Dr. W. Spottiswoode, P.R.S.; Dr. W.H. Stone.

15 *Organ-builders.*—Bevington, Bros.; Bishop and Son; Bryceson Bros., and Ellis; *A. Cavaillé-Coll, of Paris; Forster and Andrews, of Hull; Gray and Davison; *Hill and Son; Jehmlich, of Dresden; H. Jones; T. C. Lewis and Co.; Herrman Smith Telford and Telford, of Dublin; Ullmann, of Vienna; J. Walker and Sons; H. Willis.

6 *Pianoforte-makers.*—Erard; *A. J. Hipkins, of Broadwood's; H. K. Moore, of Moore and Moore; Steinway; Streicher, of Vienna; Stuttaford, of Debain's.

2 *Horn-makers.*—Blaikley, of Boosey's; V. Mahillon, of Brussels

2 *Instrument-makers.*—G. Appunn, of Hanau; W. Ladds.

2 *Tuning-fork-makers.*—Valantine and Carr, of 76, Milton-street, Sheffield; Secretan, of Paris.

2 *Bell-founders.*—Cavedini, of Verona; Colbacchini, of Padua.

2 *Musicians.*—*Moritz Fürstenau, librarian of the Dresden Opera; Ch. Chambers, Mus.B., Newcastle-upon-Tyne.

3 *Violin-makers.*—Hart and Son, 28, Wardour-street; Hill and Son, 72, Wardour-street; E. Withers, 24, Wardour-street.

44 *Organists.*—E. Adams, St. Lawrence Jewry; Dr. Armes, Durham Cathedral; W. Bensted, All Hallows, Lombard-street; H. R. Brinfield, St. Lawrence, Reading; J. T. Burrowes, St. James, Piccadilly; H. Byolin, St. Mary, Shrewsbury; T. L. Childerstone, St. John, Clerkenwell; N. W. B. Collyer, Mercers'-hall Chapel; E. Deane, St. Mary Aldermary; *H. Degenhardt, St. Catherine, Hamburg; Dr. G. Dixon, Grantham; Sir G. Elvey, St. George's Chapel, Windsor; J. G. B. Elliott, St. Stephen, Haggerstone; C. J. Frost, St. Mary, Haggerstone; Mrs. Green, St. Katharine, Regent's-park; F. Grizelle, Fulham; W. G. Hammond, St. Botolph, Aldgate; *E. J. Hopkins, Temple Church; A. W. Hume, Barking, Essex; J. Howlett, Trinity, Gosport; W. J. Ions, St. Nicholas, Newcastle-upon-Tyne; W. J. James, Shadwell; C. S. Jekyll, Chapel Royal, St. James's; H. Jimmerthal, St. Marie Cathedral, Lübeck; W. C. Lock, St. Dunstan, Stepney; C. Marshall, St. Alban, Wood-street; R. Massey, late of Chapel Royal, Whitehall; Miss Nottingham, St. Mary, Rotherhithe; C. W. Pearce, St. Luke, Old-street; W. Rea, late of Tynedock Church. Newcastle-upon-Tyne; J. Ridgway, Holyrood Church, Southampton; *H. Schmahl, St. Jacobi, Hamburg; *Dr. Sellé, Hampton-court Palace; C. Severn, St. Mary, Islington; Dr. Stainer, St. Paul's; Mrs. Stirling (Bridge), St. Andrew Undershaft; H. Stonex, Parish Church, Yarmouth; H. Streatfield, Maidstone; E. H. Thorne, St. Michael, Cornhill; Th. Tunbridge, St. George's Chapel, Great Yarmouth; J. Turle, Westminster-abbey; F. Weber, German Chapel Royal, St. James's; F. I. Yeatman, All Hallows the Great and Less, Upper Thames-street; B. Yñiguez, Cathedral, Seville.

6 *Choir Conductors and* 542 *Members of their Choirs.*—Henry Leslie, W. G. McNaught, J. Proudman, Ebenezer Prout, G. I. Venables, L. C. Venables.

wards and forwards, made in each second by a particle of air, while the note is heard." The words in inverted commas are briefly represented by the letter V. Thus, by V 256 is meant a musical sound due to 256 vibrations in a second. On the Continent, they usually reckon by *single* or half vibrations, as in counting a pendulum, written SV. Thus SV 512 means the same pitch as V 256. By V 256·3 is meant 2563 double vibrations in 10 seconds, and so on for other decimals.

Art. 3. *Musical Pitch* is the pitch, or V, of any named musical note, which determines the pitch of all the other notes in a particular system of tuning, and gives the pitch of the instrument producing it. For the sake of comparison, the same note A is here always selected, and, when it was necessary to determine the pitch by measuring the V of some other note, the V of A has been always calculated. By A 444 is meant the note called A, which makes V 444.

Art. 4. *Systems of Tuning, or Temperaments.*—For perfect harmony, the Fifths and major Thirds, in the treble at least, should produce no perceptible beats or roughness. This effect could not be obtained without many more than 12 notes to the Octave, the largest number used on ordinary organs, harmoniums, and pianos. Hence arose various contrivances, known as tunings, or temperaments (from the Italian *temperare*, to tune). In the history of pitch it is necessary to distinguish and allow for the following :—

1) *Just Intonation*, where all the Fifths and Thirds are perfect. Used only by unaccompanied singers and theorists.

2) *Pythagorean Temperament*, in which the Fifths of the series, E *flat*, B *fl.*, F, C, G, D, A, E, B, F *sharp*, C *sh.*, G *sh.* only, are perfect, and the major Thirds E *fl.* G, B *fl.* D, FA, CE, GB, DF *sh.*, AC *sh.*, EG *sh.* only, are a comma, or V 1 in V 80 too sharp. Used in tuning the violin.

3) *Meantone Temperament*, in which all the major Thirds specified in (2) are perfect, but the Fifths specified in (2) are a quarter of a comma, or V 1 in V 322 too flat. Formerly used on all organs.

4) *Equal Temperament*, in which every Fifth, without exception, is one-eleventh of a comma, or V 1 in V 885 too flat, and every major Third, without exception, is seven-elevenths of a comma, or V 1 in V 126, too sharp. Now always used intentionally.

These temperaments will be distinguished by prefixing J for just, P for Pythagorean, M for meantone, and E for equal, to the name of the note calculated. The tuning note, which is measured, might be in any system, and hence is not distinguished. Thus, A 444 being measured, gives JC 532·5, MC 531·2, PC 526·2, and EC 528. In Table I., at the end of this paper, the JC, MC, and EC are calculated, corresponding to any A or other note that was measured, and the JA, MA, and EA corresponding to any C or other note that was measured.[2]

Just intonation is due to Ptolemy, the astronomer, alive A.D. 166. Meantone temperament was perfected by Salinas, A.D. 1577. Equal temperament is said to have been proposed by Aristóxenus, a pupil of Aristotle, and to have been in use in China for centuries earlier. It seems to have been used, in intention, in North Germany, as early as 1690, and to have remained on many organs. (See A 489·2 in Table I.) It was recommended by E. Bach, and is believed to have been used by J. S. Bach. But, throughout Europe generally, meantone temperament was used till about 50 years ago. It is still retained generally on Spanish organs, and in England on Green's organs, at St. George's Chapel, Windsor; St. Katharine's, Regent's-park; and Kew

[2] *Calculation of Temperaments.*—It is absolutely necessary, for all investigations on historical musical pitches, to be able to calculate A from C, and C from A, and sometimes from other notes, and often to find the V to all the notes in any system of temperament when the V of one is known.

To find C from A.

1) In Just Intonation, increase the V of A by one-fifth. Thus, to A 440, add one-fifth, or 88, to find JC 528.

2) In Meantone Temperament, first find JC, and then subtract 3 in 1,000 and 1 in 10,000, working to two places of decimals, and finally retaining one. Thus, from A 440, find JC 528, and then subtract 1·58 or 3 in 1,000, and also ·05 or 1 in 10,000; that is, 1·63 on the whole, giving 526·37, whence MC 526·4. A 418 gives MC 500.

3) In Equal Temperament, first find JC, and then subtract 1 in 111. Thus, for A 440, we find JC 528, which, divided by 111, gives 4·76, and substracting this we obtain 523·24, whence EC 523·2.

To find A from C.

1) In Just Intonation, subtract one-sixth. Thus, one-sixth of C 528 is 88, which, subtracted, gives JA 440.

2) In Meantone Temperament, find JA, and increase the result by 3 in 1000 and 1 in 10000. Thus, one-sixth of C 526·4 is 87·73, which, subtracted, leaves 438·67, and this increased by 1·31, or 3 in 1000, and ·04 or 1 in 10000 gives 440·02, whence MA 440.

3) In Equal Temperament, find JA, and increase the result by 1 in 110. Thus, from C 523·24 we find JA 436·03, and, adding the 110th part, or 3·97, the result is EA 440.

A justly Intoned scale can be formed by adding one-eighth for the major Tones C to D, F to G, and A to B; one-ninth for the minor Tones D to E, and G to A; and one-fifteenth for the diatonic semitones E to F, and B to C.

A Pythagorean scale can be made from a series of Fifths up, adding one-half for each Fifth, and dividing by 2 when necessary to keep within the Octave; or a series of Fifths down, subtracting one-third for each Fifth, and doubling the result where necessary to keep within the Octave. Work up to G *sharp*, and down to E *flat*, beginning anywhere.

A Meantone scale can be formed by taking the perfect Fifths, as in the last case, and then diminishing each upward and increasing each downward Fifth, as it is calculated, by 31 in 10000. Thus, the perfect Fifth above C 256 is found by adding one-half, or 128, to be JG 384; taking 3 in 1000, and 1 in 10000, we have 1·19, which being subtracted, gives MG 382·81; and the perfect Fourth below C 256 is found, by subtracting one-third, or 85·33, to be JF 170·67, double which is 341·34; and then, taking 3 in 1000 and 1 in 10000, we have 1·06, adding which we have MF = 342·40. Begin anywhere, and work up to G *sharp* and down to E *flat*. Make two places of decimals and keep one.

A scale in Equal Temperament can be made by first forming a series of equal Tones by continually adding 12½ per cent., the proof being that the Sixth Tone thus found is scarcely more than double the first; then, the semitones may be found, by adding 6 per cent. to each of the Tones, and afterwards subtracting 1 in 2000. The result ought not to be wrong by one-tenth of a vibration anywhere.

The above are chiefly close approximations, very convenient for those who can use decimal fractions but do not understand logarithms. For those who do, the following table will be much more convenient.

To the logarithms given below, add the logarithm of the V of C, and the result is the logarithms of all the corresponding notes. When the V of any other note is given (as of E), subtract the logarithm opposite that note (as E) in the table from the logarithm of the V of the given note (as E.) The result is the logarithm of the corresponding V of C, having found which proceed as before. Find numbers corresponding to the logarithms to one place of decimals only.

Table of the Logarithms of Tempered Notes.

Note.	Just.	Meantone.	Equal	Pythagorean.
C	·0	·0	·0	.0
C *sharp*		·01908	·02509	·02852
D	·05115	·04846	·05017	·05115
E *flat*		·07783	·07526	·07379
E	·09691	·09691	·10034	·10231
F	·12494	·12629	·12543	·12494
F *sharp*		·14537	·15051	·15346
G	·17609	·17474	·17560	·17609
G *sharp*		·19382	·20069	·20461
A	·22185	·22320	·22577	·22724
B *flat*		·25258	·25086	·24988
B	·27300	·27165	·27594	·27840
C *octave*	·30103	·30103	·30103	·30103

Parish Church, and on a few other organs; but equal temperament is now generally aimed at, though seldom really attained.[3] Messrs. Broadwood did not use it on any of their pianos till 1841, and it was generally introduced in their works, under the superintendence of Mr. Hipkins, from 1844 to 1846. The organ of St. Nicholas, Newcastle-upon-Tyne, was tuned in equal temperament in 1842, on the occasion of a great musical festival (see A 428·7 in Table I.). In the Great Exhibition of 1851, no English organ was tuned in equal temperament. In July, 1852, while making alterations in their Exeter-hall organ, Messrs. J. W. Walker and Sons put it into equal temperament, and it was first used in that tuning in November, 1852. In the meantime, in September, 1852, Mr. George Herbert, a barrister and amateur, then in charge of the organ at the Roman Catholic Church in Farm-street, Berkeley-square, had that organ tuned equally by Hill, its builder. Though much opposed, it was visited and approved by many, and, among others, by Mr. Cooper, who had the organ in the hall of Christ's Hospital tuned equally in 1853. The first organ built and tuned originally in equal temperament, by Messrs. Gray and Davison, was for Dr. Fraser's Congregational Chapel at Blackburn, in 1854 (since burned). Messrs. Walker and Mr. Willis also sent out their first equally tempered organs in 1854. Hence, in England, equal temperament is barely 40 years old. (See additional information in Appendix No. 1.)

Before, and, indeed, after 1577, many unequal temperaments were used, and the meantone temperament itself is commonly called *unequal*, whereas, when expressed on 12 notes, it is merely defective, because it requires 27 notes to the Octave for its full development, as is shown in ordinary musical notation. The law followed in these unequal temperaments is generally so unknown that the exact values of the notes cannot be calculated. There was, however—at least, on the old bonded or fretted clavichord—a semi-meantone temperament, in which the natural notes C, D, E, F, G, A, B were tuned in meantone temperament, and the chromatics were interpolated at intervals of half a meantone. This was very like equal temperament in most keys. But, in the calculations of this paper, none but the Just, Meantone, and Equal systems of tuning will be regarded, and all the unequal temperaments, which were slight variations of the meantone system, will be treated as belonging to that species of tuning.

Art. 5. *Equal Semitones as a Measure of Relative Pitch.*—If we supposed that, between each pair of adjacent notes, forming an equal semitone as a piano is now intended to be tuned, 99 other notes were interposed, making exactly equal intervals with each other, we should divide the octave into 1200 equal hundredths of an equal semitone, or *cents* as they may be briefly called. We generally estimate intervals in music by the number of semitones they contain; thus, the minor Third has 3, the major Third 4, the Fourth 5, the Fifth 7 semitones. and so on. In the same way, very small intervals, less than a semitone, may be estimated in cents. Thus, S 3·56 means an interval of 3 semitones and 56 cents. In this way, in Table I. the interval formed by the initial value of A in each entry with A 370 is given.[4] The interval between any two such values of A is the difference of the corresponding S. Thus, the interval between A 455·3, S 3·59, and A 422·5, S 2·30, is S 1·29, which is the interval between Handel's and Erard's concert pitch.

Art. 6. *Notation of the Great Musical Scale.*—As the name of the note is the same in the different octaves, it is necessary to mark the Octave. I shall here adopt the organ-makers' names, by which an Octave is referred to a certain number of feet, and give it a practical notation. These names neither indicate the exact length of pipe nor the exact pitch of the note, but merely show the position of the note on the musical staff.

32 C, lowest note of very large organs (2 octaves below the lowest note of the violoncello), 32 D, 32 E, 32 F, 32 G, 32 A (usual lowest note of the largest pianos), 32 B, comprising the 32-foot Octave.

16 C (lowest note of the double bass in Beethoven's Pastoral Symphony), 16 D, 16 E (lowest note of the German four-stringed double bass mentioned by Helmholtz, p. 267 of my translation, as the lowest really musical note), 16 F (lowest note of English four-stringed double bass), 16 G (lowest note of Italian three-stringed double bass),

[3] *How to Tune Equally.*—In my translation of Helmholtz, p. 785, I gave a rule for tuning sensibly in equal temperament, and I put it into a thoroughly practical form in the *Musical Times* for 1st October, 1879, pp. 520—521. It may be epitomised thus. Tune the bearings in the one-foot Octave of an organ or harmonium in the order C, G, D, A, E, B, F *sh.*, C *sh.*, G *sh.*, D *sh.*, A *sh.*, E *sh.* Make all the Fifths too close, and all the Fourths too wide, so as to beat the Fifths "up," CG, DA, EB, C *sh.* G *sh.*, D *sh.* A *sh.*, *twice* in a second, and the Fourths "down," GD, AE, BF *sh.*, F *sh.* C *sh.*, G *sh.* D *sh.*, A *sh.* E *sh.*, *three* times in a second. The Fourth CF is not tuned. The pitch is unimportant. The beats hardly last long enough to be available for the piano, which should be tuned to an harmonium.

[4] *To Calculate the Cents in any Interval.*—1) For intervals less than an equal semitone—that is, when the larger V is not more than 6 per cent. larger than the smaller V: Divide 100 times the difference of the V by 6 per cent. (less 1 per 2000) of the smaller V, to the nearest whole number. Thus, to find the interval between A 422·5 and A 440: 100 times the difference is 1750, and 6 per cent. of 422·5 is 25·3, and this, less ·2 (or 1 per 2000 in 422·5), is 25·1; then, dividing 1750 by 25·1, we obtain 70 cents.

2) If the interval is more than an equal semitone, we can continually form equal Tones and semitones, above the lowest, by adding 12½ per cent. for a Tone, and 6 per cent. (less 1 per 2000) for a semitone, till we obtain a V which is less than an equal semitone from the larger number. Then, we find the cents in this smaller interval by the last rule, and add 100 for each equal semitone added on to the lower V. Thus, for A 422·5 and A 455·3, we form an equal semitone above 422·5 by adding 25·1 (or 6 per cent., giving 25·3; less 1 per 2000, that is, ·2), giving 447·6. Next, we find the cents in the interval V 447·6 to V 455·3 to be 29, as in the last case, and we have 129 cents. for the whole interval.

3) For intervals less than a just major Third—that is, when 8 times the larger V is not greater than 10 times the smaller V—multiply 3477 by the difference of the V's, and divide by their sum. If the quotient lies between 150 and 300, subtract 1 from the quotient; the result is exact. Thus, for the last example, 3477, multiplied by the difference 32·8, gives 114045·6; and this, divided by the sum 877·8, gives 129 cents., as before. It is evident that this may be applied to any interval by continually reducing it by a just major Third till it is less than a major Third. This is effected by continually subtracting 10 times the smaller from 8 times the larger V, and adding 386⅓ cents. to the result, for every such reduction. When the interval exceeds an Octave, divide the larger V continually by 2 till it is less than double the smaller; then proceed as before, and add 1200 to the result for each division by 2.

4) For any interval, by logarithms (by far the most convenient method for those who can use them). Multiply the difference of the logarithms of the two V's by 4000 (which will be enough for intervals under a semitone); correct by subtracting 1 in 300 and 1 in 1,000 from the former product. The result will be correct to one-tenth of a cent. Thus, log 455·3 = 2·65830, log 422·5 = 2·62583; difference = ·03247, which, multiplied by 4000, gives 129·88. Subtract 1 in 300, or ·43, and 1 in 10000, or ·01 (sum ·44), and the result is 129·44 cents, or 129 to the nearest cent. When many cases have to be calculated, it is best to form a little table of the multiples of 39·86314, and, by its means, multiply the difference of the logarithms by that number. This was the method pursued for Table I.

16 A (lowest note of English three-stringed double bass), 16 B, comprising the 16-foot Octave.

8 C (lowest note of the violoncello, written on the second leger line below the bass staff), 8 D, 8 E, 8 F, 8 G (third open string of violoncello), 8 A, 8 B, comprising the 8-foot Octave.

4 C (tenor C, the lowest note of the viôla, written on the second space of the bass staff), 4 D (second open string of violoncello), 4 E, 4 F, 4 G (lowest note of the violin and of the English concertina), 4 A (first, or highest, open string of violoncello), 4 B, comprising the 4-foot octave.

2 C (middle C, written on the leger line between the bass and treble staves), 2 D (third open string of the violin), 2 E, 2 F, 2 G, 2 A (second open string of the violin, the *tuning note* for orchestras, and the note to which all pitch is referred in Table I.), 2 B, comprising the 2-foot Octave.

1 C (Treble C, a very usual tuning note for pianos, and pitching note for singers), 1 D, 1 E (first, or highest, open string of the violin), 1 F, 1 G, 1 A, 1 B, comprising the 1-foot Octave.

½ C, ½ D, ½ E, ½ F, ½ G (usual highest note of flute), ½ A, ½ B (highest note of the English concertina), comprising the ½-foot or 6-inch Octave.

¼ C, ¼ D, ¼ E (highest note on the violin, the double Octave harmonic of its highest string), ¼ F, ¼ G, ¼ A (usual highest note of large pianos), ¼ B, comprising the ¼-foot or 3-inch Octave. And so on for higher Octaves, used only on certain stops of organs.

Art. 7. *Carriers of Pitch.*—As very few persons are able to reproduce a pitch at will after the lapse of a short time, it is necessary to have instruments by which a given pitch-note may be sounded at any moment. The oldest of these contrivances are the metal cylindrical open flue *organ-pipe*, and the stopped *pitch-pipe*. In later times, the *tuning-fork* and the *free reed* have been used. In orchestras, the *oboe*, a reed pipe, is generally sounded for the other instruments to tune to.

Art. 8. *The Organ Pipe.*—The pitch rises with heat, and falls with cold, often making a semitone between its winter and summer pitches. When the V at any given temperature is known, the V at any other temperature may be found, with sufficient exactness, by increasing the first V by 4 per cent., dividing by 1000 to 2 places of decimals, multiplying the result by the number of degrees Fahrenheit by which the observed differs from the required temperature, and adding or subtracting according as we reduce to a higher or a lower temperature. In this way all the organ pitches in table I., which I have myself observed, have been reduced to the pitch they would have at 59° F.= 15° C.= 12° R. Thus, A 528, at 59° F., gives what at 73° F.? To 528 add 4 per cent., or 21·12, which gives 549·12, and this, divided by 1000 to 2 places of decimals, gives ·55, which, multiplied by 14 (the difference of 73° and 59°), gives 7·70, and, as the required temperature is greater, we have to add this 7·70 to 528, producing A 535·7 at 73° F. (See A 441·7 and A 444·7 in Table I.) As the wind used is often of a lower temperature to the air about the organ, and as the expansion of the air effects the temperature, the rule is not always perfectly accurate, but I have found it sufficiently so for the purposes of this paper. After touching an organ-pipe, or blowing it with the mouth, it should be left to cool before its pitch is taken. For the same temperature, the pitch is mainly influenced by the length of the pipe, measured from the line where it is soldered on to the foot, up to the open end, and by the internal diameter. If these dimensions are taken in inches, the pitch or V of the pipe is very nearly 20080, divided by the sum of 3 times the length added to 5 times the diameter, according to M. Cavaillé-Coll (adapted from *Comptes Rendus*, 1860, p. 176), and in the two-foot Octave I have seldom found the result so much in error as a comma, or V 1 in V 80. If we actually find the V of a similar pipe, and multiply it by the sum of three times the length added to five times the diameter (expressed in inches), and use this product in place of 20080, we may find the pitch of another pipe of the same kind, differing slightly in length and diameter, by dividing this product by the sum of three times the new length added to five times the new diameter, both taken in inches.[5] I have had to use this device frequently when the actual dimensions of pipes made for me differed from their intended dimensions, in order, from the pitch of the actual pipe, to deduce that of the intended pipe. (See Table I., A 373·7, 376·6, 396·4, 424·4, 434·7, 504·2, 505·8.)

The strength of the wind used is important. The above rule supposes this pressure to be capable of supporting a column of water about 3¼ inches high. From experiments made by M. Cavaillé-Coll, as pressure varies from 2¾ to 3¼ inches, V increases by about 1 in 300, but, as pressure varies from 3¼ to 4 inches, V increases only by about 1 in 440; the whole increase of pressure from 2¾ to 4 inches increases V by about 1 in 180. Hence the pitch of A may vary by from V 1 to V 2½ from this cause only. (See actual observations in Table I., under the pitches last cited, and A 446·0.)

The quantity of wind, regulated by the size of the wind-slit and the orifice at the foot, is another source of variation. The shape of the mouth, and especially the shading of the mouth or extremity, greatly influences pitch. Hence a solitary pipe removed from the organ where it was shaded by adjacent pipes, is often sharper. Cleaning an organ sharpens it. Even removing a pipe and replacing it will often alter the pitch. An organ-pipe is slightly flattened by pressing in, and slightly sharpened by pressing out, the edges of its open end, as by the "tuning cone;" but considerable changes require the pipe to be lengthened or shortened.

It is clear, therefore, that, when the V of a pipe is not measured as it stands in the organ itself, the pitch given may be several vibrations in error.

[5] *M. Cavaillé-Coll's Rule.*—This rule requires to be a little changed for stopped and square pipes. For the square wooden pipes the agreement is not quite so good as for the open metal cylindrical pipes, and a device similar to that in the text must always be employed for them. (See Table I. (1) A 424·2.) In square pipes, the depth is from the mouth to the back, internal measure.

Complete Rule.—Pressure of wind about 3¼ inches or 8 centimetres. Divide 20080 when the dimensions are in inches, and 510000 when the dimensions are in millimetres, by—

(1) Three times the length added to five times the diameter for *cylindrical open* pipes.

(2) Six times the length added to ten times the diameter for *cylindrical stopped* pipes;

(3) Three times the length added to six times the *depth* for *square open* pipes; and

(4) Six times the length added to twelve times the *depth* for *square stopped* pipes.

The rule is always sufficient for cutting organ pipes to their approximate length, and piercing them to bring out the Octave harmonic, and has long been so used in M. C.-C.'s organ works.

And even where we are fortunate enough to find an organ with pipes that have remained unaltered for 200 or 300 years, which is seldom the case, we cannot be sure that it stands exactly at its original pitch. This must, of course, be borne in mind for all the cases of organ-pitch given in Table I. But the extreme amount of error will seldom be 1 per cent., which, for present purposes, is insignificant. In point of fact, the exact pitch of an organ cannot be ascertained, for it is so large that various parts of it are constantly at variable temperatures, and hence are constantly liable to be at different pitches, or out of tune with each other. Hence, in measuring the pitch of an organ, I always select the 2 A or 1 C of the open metal diapason, and, if possible, on the great organ, and consider that to be the pitch for which the organ was constructed.

Art. 9. *The Pitch-pipe* (of which I am able, through the kindness of the Bellfoundry Colbacchini, at Padua, to show you two very curious Italian examples of 150 and 100 years old, described under A 425·2 in Table I. below) is subject to all the errors of an organ-pipe, and being blown by the warm breath at very different pressures cannot be depended on for accuracy. But its portability, and the easy production of one or two Octaves of tone by sliding the piston in and out, formerly rendered it indispensable to singers who had no instrument to guide them. Pitch derived from flutes, clarinets, and oboes is also very uncertain. (See remarks in Table I., under A 395·2, 410·0, 413·3, (2) A 418·0, 422·0, 425·2.)

Art. 10. *The Tuning-fork*, originally called the *Pitch-fork*, was invented by John Shore, Royal Trumpeter, in 1711, Sergeant-Trumpeter at the entry of George I. in 1714, and Lutist to the Chapel Royal in 1715. He died deranged in 1753. Hence the tuning-fork is probably not more than 150 years old. It was very rude at first, as in these two curious examples of very early forks indeed (see A 419·9 and A 454·2, in Table I.), but has, in late years, become a beautiful philosophical instrument, as in the larger forks before you. It is very permanent. I have reason to believe that Scheibler's forks have not varied by one vibration in ten seconds, since his death in 1837. It varies very slightly for temperature, being (contrariwise to the organ-pipe) flattened by heat and sharpened by cold to the amount of about V 1 in V 21000 for each degree Fahrenheit. When, therefore, careful experiments have to be made, a tuning-fork should never be touched by the hand at all (wood or paper being interposed), or carried in the pocket, or struck hard or often (every blow heats, and, therefore, flattens it very slightly); but, for ordinary purposes, this is immaterial. As forks are tuned by filing, which not only heats them, but unsettles their molecular arrangements—at least, in part—it is necessary to let them cool and rest for several days, sometimes for weeks, before their pitch can be depended on for scientific accuracy. They will often rise by several vibrations in ten seconds in the course of cooling. Hence copies are always apt to be too sharp, and should, if possible, be re-compared. This has often caused me much difficulty, and, in several cases, a doubt will necessarily remain on such copies which have been sent to me. The difficulty of tuning a fork in exact unison with another is also extremely great. Hence, in Table I., such pitches may be too sharp by half a vibration in a second, or even more. We seldom find a batch of tuning-forks at the same pitch. (See A 435·4 in Table I.) On the whole, however, no more accurate means of preserving pitch exist. Two great sources of permanent injury to a fork are wrenching or twisting the prongs (as by a fall, or screwing the forks in and out of resonance-boxes, when the prongs ought never to be touched; or fixing both prongs in a vice to file) and rust. To preserve from rust, never stroke the prongs with the fingers (as musicians have a habit of doing), do not speak over the forks, keep them carefully from the damp (the large forks on resonance-boxes in chamois leather stalls, the smaller ones in cases, or folded in paper) and oil them occasionally with a film of limpid gun-lock oil (to be obtained from any gunsmith). If rust forms, prevent it spreading by applying oil, but be careful not to use sand-paper, as that will certainly injure the pitch still more. As most old forks are more or less rusty, it is important to have some notion of the amount of injury inflicted. Actual cases are investigated in Table I., under A 441·1, 441·8, and (1) 443·2. But I found it advisable to try the following experiments:—Three ordinary forks, having been carefully measured, were immersed in water, one halfway from the end of the prongs, another halfway from the stem end, and a third totally. First experiment: they were left 48 hours in water, and then taken out without wiping and allowed to dry during 24 hours, they were then wiped and tried. Second experiment: afterwards, they were repeatedly immersed for a day or two, and taken out, being left to dry by themselves; this produced a large quantity of rust, which was rubbed off with soft paper, and then the forks were well oiled. The following were the results:—

Forks.	Original Pitches.	Pitches after immersion.	Alteration in V.	Alteration per cent. of V.
First Experiment—				
Prongs immersed	518·77	518·79	·0	·0
Bend immersed	528·20	527·90	— ·3	—·0568
Totally immersed	258·77	258·63	— ·14	—·0541
Second Experiment—				
Prongs immersed	518·77	518·44	— ·33	—·06
Bend immersed	528·20	526·30	—1·90	—·36
Totally immersed	258·77	257·72	—1·05	—·41

These experiments show that a slight amount of rust is imperceptible, and that with a very large amount, such as could not occur without the greatest carelessness, as in the old fork, described under A 454·2 in Table I., the error is never likely to exceed 4 in 1000. For measuring pitch this would be fatal, but for merely conveying the history of a pitch it is perfectly unimportant. Observe that rust towards the extremity of the prongs is of slight importance, and, in case of complete rusting, almost the whole effect is due to rust at the bend. In all cases, the effect is to flatten the fork.

Art. 11. *The Reed.*—Harmonium reeds, placed in little tubes and blown by the mouth, may be classed with the pitch-pipes, convenient, but untrustworthy. The reed itself is apt to vary, and the pitch also depends greatly on the force of the wind. (See (1) A 442·5 and (1) A 448·0 in Table I.)

Art. 12. *Measurers of Pitch.*—The following are the principal methods for determining the V of any note heard:—1. By a string. 2. By the siren. 3. By the optical method of Professor McLeod and Lieut. Clarke. 4. By Professor Mayer's electrographic method. 5. By beats.

Art. 13. *The String.*—A string, stretched by a constant weight, may be stopped at different places, and each sounding length will determine a different note, as on the violin. If the string were perfectly elastic and uniform, the V of these notes would be inversely proportional to the length of the string.

Assuming this to be always the case, Mersenne (1648) took a string long enough to allow its vibrations to be seen and counted, and then shortened it till it was in unison with a given note, and, after multiplying the observed V by the first length, divided it by the second (each expressed in the same unit), to find the V of the given note. He was, of course, very wrong, making an organ-pipe four French feet in length, speak, at one time, V 84, and at another, V 96, whereas, it probably spoke V 112. (See A 373·7, and A 376·6 in Table I).

J. H. Griesbach (1860) greatly improved on this method, by tuning a string, one-fifth of an inch (more accurately 5½ mm.) thick, till one-quarter of its length was in unison with a given note, and then counting the vibrations of the full length of the string (which was kept in action by a continuous bow) by making the string, as it reached its upper position, mark a strip of paper passed over it, on which seconds were also marked as they elapsed. The instrument itself is in Room Q of the Scientific Collection at the South Kensington Museum, with a description from the *Journal of the Society of Arts* for 6th April, 1860, p. 353. The extreme care with which Mr. Griesbach, worked, and, at the same time, the untrustworthiness of the arrangement, which is crowded with sources of error, is shown by some of his results; thus, his V 416, V 521·6, and V 528, are shown, by remeasurement of the forks to be V 422·5, V 524·8, and V 534·46.

Euler and Bernouilli worked out the problem of the string mathematically,[6] but the difficulties of determining the unison, measuring the lengths, finding the weight, and obtaining uniformity in the string, together with those arising from its thickness, are so great, that the method cannot be relied upon for any great accuracy. We are, however, indebted to it for some important measurements by Euler, Dr. Robert Smith, Marpurg, Fischer, and De Prony. (See Table I., under A 392·2, 414·4, (2) 424·2, 427·6, (1) 431·7, 437·3, 438·2, (1) 441·7, (1) 444·5.)

Delezenne, of Lille, made the best use of the stretched string. Having proved that only the finest wire which would bear the strain would give satisfactory results, he stretched 700 millimètres of such a wire on a violoncello body, tuned it to Marloye's fork of V 128 (which was, probably, very accurate, as Marloye's V 256 was so), and then, by a movable bridge, cut off the length, which gave a unison with a given fork. Measuring this length in millimètres, he divided 128 × 700 = 89,600 by it, to find the V. For organ-pipes, he first tuned a fork with sliders in unison with the pipe, and then measured the fork so tuned by his sonometer. (See Table I., under A 450·5.) I am indebted to Delezenne for numerous important pitches, which he believed to be correct within three-tenths of a comma, or about V 37 in V 10000, and they are, very probably, still more accurate. He estimates that those who use Euler's formula may be wrong by a comma, or V 1 in V 80, or V 125 in V 10000, owing to the mere thickness of the string necessary to support the stretching weight.

Art. 14. *The Siren* of Baron Cagnard de la Tour consists of a perforated disc, which is driven round by a stream of air, and, allowing puffs to pass through the oblique holes, makes a musical sound, of which the V is the number of such puffs in a second counted by an appended mechanism. M. Cavaillé-Coll added a bellows giving a constant pressure of wind, and, he tells me, that Lissajous determined the pitch of the French Diapason Normal by its assistance. M. Cavaillé-Coll also improved the counting apparatus, by which he has been able to obtain even more accurate results. The ordinary siren of commerce is very untrustworthy; for example, Mr. Hullah's forks, thus measured, and intended to make V 512, really made V 524·8 to V 525 (See Table I., under A 441·3.) Even at the best, it is a difficult instrument to manipulate. Probably all the determinations of pitch made for the French Commission in 1859 were made by Lissajous and Despretz with this instrument, as well as those cited by de la Fage as made by Lissajous. These and other pitches determined by the ingenious inventor himself are all cited in Table I.

Art. 15. *The Optical Method*, invented by Prof. Herbert McLeod and Lieut. R. G. Clarke, R.E., and described in the "Proceedings of the Royal Society," for January, 1879 (vol. 28, p. 291), consists in viewing white lines, on a rotating cylinder, through the shadow of a constantly vibrating fork. The result is apparently, a dark wave, which remains stationary when the V of the fork is the same as the number of white lines which pass before the eye in a second. For effecting this, and counting the lines that pass, there are elaborate contrivances. The machine is very difficult to manipulate, but, probably, extremely accurate in result. It will be seen that I am greatly indebted to it for several measures of vital importance to my investigations.

Art 16. *The Electrographic Method* was invented by Professor A. Mayer, of Stevens Institute, Hoboken, New Jersey, U.S., who is preparing for publishing it in all its details. In this method, a camphor-smoked paper on a metallic rotating cylinder is inscribed with a wave-curve by an aluminium point fastened to one prong of a large

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[6] *Formula for finding pitch* from a heavy weighted suspended string. Let

L = the vibrating length of the string from the suspending point to the movable bridge, expressed very accurately in English inches.

l = the same in French millimètres.

W = the stretching weight of the string, including the weight of non-vibrating part of the string, expressed in any unit.

w = the weight of the vibrating length of the string in the same unit. These weights of the string are best obtained by stretching a similar string by the same weight and leaving it for some days till the stretching is complete, then cutting off a known length of it, weighing it, and dividing the whole weight of the string by the whole length to determine the weight of an inch or a millimètre of it. The weights are then found by measurement.

V = the number of double vibrations in a second. Then

$$2 \log V = 1{\cdot}98485 + \log W - (\log w + \log L)$$
$$= 3{\cdot}38968 + \log W - (\log w + \log l)$$

fork, through which a powerful induction coil, actuated by a seconds' pendulum, throws a spark, which burns a single hole in the paper precisely every two seconds. By counting the sinuosities in the wave-curve between these holes the V is determined. The difference of pressure of the aluminium point makes no difference in the rate of vibration. The flattening caused by the point is ascertained by beats. This instrument is, of course, expensive, and difficult to adjust, and is applicable only to large tuning-forks, the V of which it determines with great exactness. As will be seen, I have been greatly indebted to Professor Mayer for several measures of pitch taken by this instrument, but they could not be completed till 1st March, and hence must be communicated hereafter. (See Appendix, No. 2.)

Art 17. *Musical Beats.*—When two musical notes of very nearly the same pitch are sounded together they produce beats, or loudnesses separated by silences, which, under ordinary circumstances, occur exactly as many times in a second as the V of one note exceeds the V of the other. The number of beats in a second can be counted easily when it lies between 2 and 5. Beyond 5 beats in a second there is considerable difficulty, arising from the rapidity of the loudnesses, and, after 6 beats in a second, the result cannot be depended on. Below 2 beats in a second there is also a difficulty, arising from the length of time occupied by each loudness. After 1 beat in a second the result can seldom be depended on. If, then, we know the exact interval between two notes, we can, by interposing forks and counting the beats, determine the exact V of each note. In particular, if the notes form an Octave, the beats in a second between them is the V of the lower note.[7]

Sauveur, 1713, used beats of organ-pipes (see A 406·6 in Table I.), and his experiments were successfully repeated by M. Cavaillé-Coll (Association Scientifique de France, Bulletin Heb., No. 81, 16 Aug., 1868, p. 126), but they were difficult and uncertain; and the organ-pipe varies too much with temperature to make it useful for measuring the pitches of other notes. Sarti (see A 436 in Table I.) complicated the matter still more by using a monochord in addition, and his result is uncertain. About 1865, Mr. Henry Willis, the well-known organ-builder, also made a number of very careful experiments with organ-pipes, tuned by a slide on a slot, and actuated by bellows of constant pressure, of his own construction, with a view of determining difference of pitch by beats.

Art. 18. *Tuning-fork Tonometer.*—If two tuning-forks, making an Octave with each other, very nearly, but not exactly, be held over a resonance jar, tuned to the higher by pouring in water, beats are heard, and may be counted for from 10 to 20 seconds, between the precise Octave of the lower fork, and its approximate Octave, while the low note itself is practically inaudible. If, then, a number of tuning-forks be interposed between the two, beating roughly four times in a second, two and two, and, after having rested sufficiently for their pitches to become permanent, are accurately counted, the V of the lower fork, and hence that of all the intermediate forks, can be determined. For verification, it is best to carry the series to at least a dozen forks beyond the Octave. The forks should be good, beating at least 45 seconds audibly with each other, and furnished with wooden handles, but not screwed on to a resonance box. The difficulty is in counting with sufficient accuracy, for if the lower fork be about V 256, there will be 64 sets of beats to an Octave, and an error of ·01 beat per second, would make the serious error of V 0·64 in determining the pitch of the lower note.

The invention of this tonometer is due to Johann Heinrich Scheibler (born 11th November, 1777, died 20th November 1837), a silk manufacturer, of Crefeld, in Germany. His account of his method and mode of measurement and the details of his tonometer of 52 forks, from A 219⅜ to A 439½, at 69° F., is given in his pamphlet, "The Physical and Musical Tonometer" (*Der Physikalische und Musikalische Tonmesser*, Essen bei Bädeker, 1834, pp. 80, and plates). His method was much more laborious than that here suggested, but his counting seems to have been wonderfully perfect. These 52 forks have disappeared since Scheibler's death, and all efforts I have made to discover them, with the help of Herr Amels and Scheibler's existing descendants (to whom I am much indebted) have hitherto failed. But a tonometer of 56 forks, which belonged, at least, to Scheibler, if it was not made by him, still exists, only there are no records of its having been counted by Scheibler. It was inherited by Scheibler's daughter, Madame M. E. L. de Greiff (died 4th September, 1854), and then by her son, Hugo Aurel de Greiff, who gave it on a long loan to Herr Jean Amels, then of Crefeld, and now of 78, Newgate-street, London, silk merchant and musician, an old friend of Scheibler's family. Herr Amels has very kindly allowed me to have the use of this tonometer since 10th May, 1879, to the present time, and I am able to show it you this evening.

It was believed that this tonometer proceeded by 4 beats in a second, from 4 A 220 to 2 A 440. A very careful count showed me that only 32 out of the 55 sets of beats were 4 in a second, and that the others varied from 38 to 42 beats in 10 seconds. The best sum of all the beats that I could obtain was 219·27 in a second, which should, therefore, be the V in the lowest fork at 69° Fahr., the mean temperature used by Scheibler. It struck me then, as possible, that the extreme forks were really of the same pitch as those of the 52-fork tonometer, namely V 219·6⅝ and 439·3¼. On that supposition, I had made the trifling error of V 0·4 in counting, and I distributed this among 20 of those 23 sets of beats, which were not exactly 4 in a second. Then I reduced the whole to 59° Fahr., and obtained the following result:—

[7] *Determining Pitch by Beats.*—Let the V of two notes be M and N, where M is greater than N, and let the ratio M and N be known, so that $n\,M = m\,N$. Let the sum of the beats in a second made by the interposed forks with the extreme notes and each other be b. Then $M - N = b$. These two equations give $(m - n)\,N = nb$, and $(m - n)\,M = mb$. If M is the Octave of N, then $m = 2$ and $n = 1$, and hence $N = b$. Suppose that we do not know the ratio M : N exactly, but know that it is nearly that of $m : n$, and also whether M is too sharp or too flat, and have observed that the sum of the beats in a second of the forks interposed between M and N is c; then 1) if M is too sharp, we have $n\,M - m\,N = c$, and $M - N = b$, whence $(m - n)\,N = nb - c$, $(m - n)\,M = mb - c$; and 2) if M is too flat we have $m\,N - n\,M = c$ and $M - N = b$, whence $(m - n)\,M = mb + c$, $(m - n)\,N = nb + c$. The easiest and most important case is when M is nearly the Octave of N, and hence $m = 2$, $n = 1$. Then in the first case $M = 2\,b - c$, $N = b - c$, and in the second case $M = 2\,b + c$, $N = b + c$.

Scheibler's 56 Fork Tonometer at 59° Fahr.

No. of Fork.	Formerly presumed pitch.	Ellis's count. Double vibrations.	Octaves of Ellis's, or simple vibrations.	No. of Fork.	Formerly presumed pitch.	Ellis's count. Double vibrations.	Octaves of Ellis's, or simple vibrations.
1	440	439·54	879·08	29	328	327·62	655·24
2	436	435·74	871·48	30	324	323·61	647·22
3	432	431·84	863·68	31	320	319·54	639·08
4	428	427·96	855·92	32	316	315·54	631·08
5	424	423·96	847·92	33	312	311·54	623·08
6	420	419·96	839·92	34	308	307·54	615·08
7	416	415·74	831·48	35	304	303·61	607·22
8	412	411·74	823·48	36	300	299·39	598·78
9	408	407·74	815·48	37	296	295·57	591·14
10	404	403·77	807·54	38	292	291·70	583·40
11	400	399·76	799·52	39	288	287·70	575·40
12	396	395·79	791·58	40	284	283·70	567·40
13	392	391·67	783·34	41	280	279·69	559·38
14	388	387·57	775·14	42	276	275·69	551·38
15	384	383·57	767·14	43	272	271·69	543·38
16	380	379·60	759·20	44	268	267·77	535·54
17	376	375·60	751·20	45	264	263·82	527·64
18	372	371·68	743·76	46	260	259·81	519·62
19	368	367·56	735·12	47	256	255·64	511·28
20	364	363·63	727·26	48	252	251·67	503·34
21	360	359·63	719·26	49	248	247·67	495·34
22	356	355·63	711·26	50	244	243·67	487·34
23	352	351·63	703·26	51	240	239·66	479·32
24	348	347·63	695·26	52	236	235·69	471·38
25	344	343·62	687·24	53	232	231·69	463·38
26	340	339·62	679·24	54	228	227·77	455·54
27	336	335·62	671·24	55	224	223·77	447·54
28	332	331·62	663·24	56	220	219·77	439·54

The difficulty was now to verify my count, which had been made with great care with the help of a ship chronometer, each set of beats having been counted repeatedly for 40 seconds. But, then, I could not feel sure of being right in my count within V 0·05 or V 0·025 at most, and this left the distributed error of V 0·02 imperceptible. From this difficulty I was relieved by the kindness, first, of Prof. Herbert McLeod, and subsequently, of Prof. Alfred Mayer. Both counted for me by their instruments already described, five large French forks which I had had made, and Prof. McLeod also lent me four of Koenig's forks, which he had carefully measured. On measuring these by Scheibler's forks, using the values given in the preceding Table, I obtained results practically identical with those of Prof. McLeod, as shown in the following Table, in which all the V are reduced to 59° Fahr. The final results by Prof. Mayer have not reached me in time enough to insert in this place, but will be subsequently communicated to the Society. (See Appendix, No. 2.)

Name of Fork.	Ellis.	McLeod.
1812, Conservatoire A.....	439·54	439·55
1818, Tuileries A.....	434·25	434·33
1820, Feydeau A.....	423·01	423·02
1789, Versailles A.....	395·79	395·83
Nominally.		
Marloye Ut_3 256.....	255·96	255·98
Koenig Ut_3 256.....	256·30	256·31
,, Mi_3 320.....	320·30	320·37
,, Sol_3 384.....	384·43	384·44
,, Ut_4 512.....	512·55	512·55

The extreme closeness of these results gave me perfect confidence in using this 56-fork tonometer of Scheibler for all the measurements made for this paper. My rule has been to determine the beats several times (generally 5, often 10) with each of two forks, and to take the mean of all the results. It is, therefore, probable that measures of forks which I could count for 10 seconds, are not so much as V 0·1 in error.

Other tuning-fork tonometers have been made by Wölfel and Koenig, both of Paris, but I have had no opportunity of examining and comparing them. Koenig is reported to have lately invented a new and exceedingly accurate counting instrument, but I have seen no description of it as yet. The great difficulty in verifying is one of the disadvantages of the tuning-fork tonometer. I have found it impossible to verify by imperfect Fifths, as their beats last too short a time to be counted with any approach to sufficient accuracy.

By furnishing Messrs. Valantine and Carr, of 76, Milton-street, Sheffield, extensive tuning-fork makers to the music trade, with standards counted by means of this Scheibler's tonometer, as thus valued, I have enabled the public to obtain small forks, such as are usually employed for giving pitch, at moderate prices, and of great accuracy, that is, seldom or ever showing half a vibration in a second different from the number impressed on them. For those who wish to know the pitch of instruments or orchestras within the usual limits, I recommend pocket-boxes of 12 forks, either V 412 to V 456 for A or V 500 to V 544 for C. Such boxes, properly fitted, would cost, complete, about two guineas. Single forks above V 412 can be made for 3s., and below to V 256 for 4s. 6d. each. Larger forks are more expensive, 6-inch prongs costing 15s. It would be quite impossible to obtain such cheap forks elsewhere with anything like the same accuracy of pitch, and I consider it one of the principal results of my long and laborious countings that I am able to show investigators where they can obtain the tools they need. Messrs. Valantine and Carr also make complete Octaves of 56 forks at similar reasonable prices, and then the operator can count for himself; they have already made two such sets.

Art. 19. *Reed Tonometer.*—To remedy the deficient power of verification in the tuning-fork tonometer, and to accomplish many other desirable objects, Herr Georg Appunn, of Hanau, invented his tonometers of 65, 33, and 57 reeds, of which copies may be seen in the South Kensington Museum, and of the two first at the Museum of King's College, London. Lord Rayleigh has also a copy of the first. I have carefully examined all of these copies. I was so pleased with the first, after long work upon it without discovering error, that I used it in my former paper for measuring pitch, notwithstanding that it differed considerably in its indications from other measurers. The cause of error could not be discovered by long work and counting with a single instrument. It was not till the Lords of the Committee of Council on Education permitted me to remove the 65 and 33-reed tonometers to King's College Museum, that I discovered the curious fact on which it depended. The decisive observations were of this kind. Suppose L, M, N are three consecutive reeds on one instrument, and P, Q, R three reeds of the same pitch on another. (In point of fact, the instruments, which had been

made independently, were not exactly in unison, and this was the first shock that my belief in their accuracy sustained.) Then I beat L with M, and M with N, and adding the observed beats, I obtained what I term the "internal beats" of L with N, that is, such as take place inside the box containing the reeds. Next, I beat L with Q, and Q with N, and adding them, I obtained the "external beats" of L with N, that is, the beats made outside the boxes containing the reeds, in the free surrounding air. Now, the internal were always more than the external beats. My first experiment showed that the internal exceeded the external beats by about 1 per cent. Continuing the experiments for many weeks, till all the beats were thus counted, and varying the experiment occasionally by sounding L, M, N, and P, Q, R, at different ends of the Museum, at least 50 feet apart, while I stood midway to count, I found, as a mean of all my observations, that the number of internal beats must be reduced by 76 per 10000 to produce the external beats, and that, consequently, the values obtained for the reeds, by counting internal beats, must be reduced in the same proportion. The internal beats were counted on the King's College copy. Last autumn I varied this experiment, by taking the pitch of each reed of all three tonometers in the South Kensington Museum, by beats with Scheibler's forks as counted above. The result was, that in order to reduce Appunn's numbers on the 65-reed tonometer (nominally V 256 to V 512) to Scheibler's, it was necessary, as a mean, to deduct 76 in 10000, precisely confirming the former result (showing that the instrument went actually from V 254 to V 508). For the first Octave of the 57-reed tonometer (nominally V 64 to V 128), the same reductions was obtained (showing that instrument went really from V 63½ to V 127). For the 33-reed tonometer (nominally V 128 to V 256), the reduction was 83 in 10000 (showing that the instrument went really from V 127 to V 253¾); but, then, [illegible] (which had been sent from Germany after Appunn's comparison) was flatter than its corresponding Octave in the 65-reed tonometer, and the Octave was not quite perfect.

What the cause of this "drawing" of the beats may be, has not yet been investigated. Its direction and amount was, I believe, entirely unknown previously, and hence Herr Appunn can hardly be blamed for overlooking it. Nor does it in any way detract from the use of the instrument. When the beats have been exactly counted, and hence the values of the reeds determined, we have only to reduce these values by 76 in 10000, with the help of a little table (like that of Scheibler's forks, p. 300, above), and the instrument is as useful as ever to determine pitch and make experiments. Thus Koenig's forks, when I take the numbers from Appunn given in my former paper, and reduce them properly, are very near what we may suppose Koenig's to have really been, as calculated from his Ut_3 = V 256·28, and supposed to be absolutely correct harmonics. Of course there were slight errors in my former measurements, which were early attempts, and frought with difficulty, and, possibly, either slight errors in Koenig's own excellent workmanship, or slight subsequent changes due to rough usage.

No. of Harmonic.	Marked values in simple Vibrations.	Calculated values in double Vibrations.	Measured by Appunn's Tonometer.	Reduced by subtracting 76 per 10000.	Difference from calculated values.	Harmonics of 64·105.
1	...	64·07	...	...		64·105
4	Ut_3 512	256·28	258·4	256·42	+ ·14	256·420
5	Mi_3 640	320·30	323·1	320·64	+ ·34	320· 25
6	Sol_3 768	384·42	387·6	384·64	+ ·22	384·63
8	Ut_4 1024	512·56	516 7	512·75	+ ·19	512·84
10	Mi_4 1280	640·70	646·0	641·07	+ ·37	641·05
14	7. 1792	896·98	905·0	898·10	+ 1·12	897·47
16	Ut_5 2048	1025·12	1032·6	1024·7	− ·42	1024·68
18	Re_5 2304	1153·26	1163·3	1154·4	+ 1·14	1153·49
20	Mi_5 2560	1281·40	1292·0	1282·1	+ ·70	1282·1

By examining the harmonics in the last column, deduced from a quarter of 256·42, it will be seen that they agree closely with the reduced numbers in the fifth column except in two cases (those in which the apparent error in the sixth column exceeds 1), and this seems to point to a small error in measurement in these two cases. All the four last pitches had to be counted by high partial tones of the reeds, and hence mistakes were very probable. But this crucial test shows that the errors made neither arose from grossly erroneous counting, nor from careless manufacture of the reed tonometer, but must have proceeded, as my other observations establish, from an acoustical phenomenon affecting all the nominal values of the reeds in the same ratio. And this is my answer to the first objection raised against my former paper. At the same time, I feel that I owe an apology to Herr Koenig, for my having been unfortunately misled by the unknown error of Appunn's instrument to attribute that error to him, and I make this apology most sincerely, for no one deserves more thanks from acousticians than Herr Koenig, both for the excellence of his workmanship, and the ingenuity of his contrivances.

Besides this acoustical acceleration of the beats, there remain two other drawbacks to Appunn's tonometers: first, they do not retain their pitch [illegible] their variation with temperature is unknown. Hence they are not, as I had hoped, instruments of scientific precision, though admirable for all purposes of lecture illustrations.

Art 20. *Practical Importance of Musical Pitch and its History.*—If two instruments, tuned to the same system, are not at the same pitch, they cannot be played together. Some instruments can be slightly altered to agree with others, but none to any great extent, and all instruments would be more or less injured in effect on being altered by a semitone, although this is the practice in Spain when instruments play with the organ. (See (2) A 419·6 in Table I.) All instruments have a limited compass, that is, they cannot produce any musical sound at all above or below a certain pitch, hence their power of transposition by a semitone or more is limited. This is most seriously felt by the human voice. If, for example, a piece of music, written for a very high pitch, is sung to a very low pitch, the lower notes will indicate depths which the voice cannot reach; this occurs in singing Orlando Gibbons's church music, which was written for a much higher pitch than we now use, and, consequently, has to be transposed to make it suit the present values which we give to the notes. (See

the conclusion of the remarks on A 567·3 in Table I.) More frequently, however, works written for a low pitch (such as Handel's A 422·5, or Mozart's A 421·6) have to be sung to a modern orchestral pitch, rather more than an equal semitone (actually S 1·27) higher. The voice of the singer, therefore, becomes distressed in reaching its upper limits, or has to give up the attempt altogether.

Now, it so happens, that a great deal of the best music was written to comparatively low pitches. This is not generally known. The notes bear no traces of it. It could only be surmised from them, as in the case of Handel, and then not with certainty. It becomes, then, of practical importance to know precisely for what pitch the principal musical composers wrote, and of antiquarian importance to trace the formation of that pitch, and its subsequent abandonment. This is what I endeavour to do in the following history.

Art 21. *Compass of the Human Voice.* — From the remarks just made, it will be readily seen that the importance of musical pitch consists in the nice adjustment of the work required from the voice to the work it is capable of performing. Hence, the first requisite to understanding the variations of pitch, or the value of any pitch proposed, is to know, in numbers of vibrations, the average limits of each kind of voice for which composers write, and on which instruments, by accompanying, impose an interpretation. It is clearly essential that no instrument should make a composer expect an impossible performance. Now, I was unable to find any satisfactory solution of this problem. The ranges of the several voices are given by Mr. Alberto Randegger, in his Primer on "Singing" (Novello, 1879), expressed in notes, which, as he kindly informed me, referred to Broadwood's medium pitch A 446·2, so that they can be immediately translated, assuming equal temperament, into numbers of vibrations. But, proceeding only by equal semitones, the intervals were too large, and although, doubtless, due to great experience, they did not seem to be founded on a sufficiently extensive observation of chorus singers; hence, I felt compelled to undertake the investigation myself. I am indebted to the great kindness and liberality of the choir conductors, Messrs. Henry Leslie, W. G. McNaught, J. Proudman, Ebenezer Prout, L. C. and G. I. Venables, and 542 members of the choirs they conduct, for having been able to try it upon a sufficiently large number of voices, to furnish a trustworthy mean. The Table in next column gives the numbers of each kind of voice examined, rejecting duplicates.

These numbers by no means represent the full numbers of the members of these choirs, but only the few who happened to be present on the practising nights that I attended, during very unfavourable weather. Thus, I attended Mr. Henry Leslie's choir during the dense fog of 27th January, when the room itself was full of fog, and the attendance was, consequently, extremely limited.

The method adopted was as follows:—I procured four forks, tuned to V 507, 522·5, 528, and 540·7, of which the three first represent the *just* C, corresponding to Handel's A 422·5, French Normal A 435·4, and Scheibler's A 440, and the last is Mr. Hipkins's fork, representing the highest Philharmonic pitch in 1874, giving EA 454·7, but JA 450·6. The first and last forks are a diatonic

Choirs in Order of Examination.	S	A	T	B	Totals.
1. Bow and Bromley Institute Choir; conductor, Mr. W. G. McNaught	22	20	23	29	94
2. Mr. Proudman's Voice-training Class, at the Tonic Sol-fa College Winter Classes	8	1	10	2	21
3. South London Choral Association, Advanced Choir; conductor, Mr. L. C. Venables	40	25	26	33	124
4. Tonic Sol-fa Choral Association, Select Choir; conductor, Mr. Joseph Proudman	20	11	10	12	53
5. South London Choral Association, Intermediate Choir; conductor, Mr. G. I. Venables	30	13	11	23	77
6. Borough of Hackney Choral Association; conductor, Mr. Ebenezer Prout	38	25	19	24	106
7. Mr. Henry Leslie's Choir; conductor, Mr. Henry Leslie	18	13	18	18	67
Total independent voices	176	108	117	141	542

semitone apart; the two middle ones are a little less than half that from each extreme. I had printed four descending scales marked *do*, *si*, *la*, *sol*, *fa*, *mi*, *re*, *do*, si_1, &c., in words or letters, and four ascending scales marked *do*, *re*, *mi*, *fa*, *sol*, *la*, *si*, do^1, in the same way. Then I asked the conductor to pitch the voices of the choir to *do* from the first fork, and the choir to sing the scale down twice, the first time marking, by scratching out, the lowest note to which each voice (after noting its own name) could sing *easily*, and the *extreme* lowest note it could sing at all, and at the second singing to revise its marks. Next, the voices took an ascending scale to the same pitch, and marked the highest *easy* note (male voices avoiding *falsetto*), and highest *extreme* note (admitting *falsetto*). The three other pitches were treated in the same way. As unaccompanied singers (especially the Tonic Sol-faists) naturally sing in just intonation, it was easy to calculate almost exactly the number of vibrations in each of the limiting notes. Then taking from the paper of each voice its easy and extreme limits, certainly found within a quarter of a tone, I was able, by adding the vibrations, and dividing by the number of voices, to get the average compass of each kind of voice, expressed in vibrations, and to compare them with Mr. Randegger's, expressed in the same way. The following Tables express the results obtained:—

The first Table gives the more important *easy*, lower and higher limiting notes of the compass of each kind of voice. The column headed *mean* gives, in name and number of vibrations, the mean note reached by the voices in the first column. The column headed *actual* gives the highest and lowest note actually sung, of all the notes from which the mean was calculated. In this column the letters H, F, S, P, refer to the pitches derived from Handel's, the French, Scheibler's, and the Philharmonic forks, all calculated in just intonation. The second Table gives the extreme limits in the same way, but these are not of so much importance, and in particular, the extreme higher limits of the bass and tenor, which include falsetto, are rather curiosities than otherwise. The third Table gives Randegger's regular and exceptional limits of the same voices, but, for comparison, the soprano and mezzo soprano are placed together, and the

tenor and barytone, instead of, as is more usual and natural, the mezzo soprano with the alto, and the barytone with the bass.

On the chart I exhibit, the whole results are written out in musical notation, in Broadwood's medium pitch, tailed white notes representing the means, and black notes with the tails turned different ways, the highest and lowest. In doing so, the notes were taken as named, except those marked H, which were taken half a tone flatter, thus HA is represented by A *flat*. On a piano, in concert pitch, no note will be then more than a quarter of a tone in error, and the table can easily be played. In the present paper, musical notation had to be avoided, for typographical reasons.

A strict comparison with Randegger will show great differences, for which probably good reasons can be given; and it should be borne in mind that Randegger's "exceptional," does not exactly correspond to my "extreme." The limits of this paper do not allow of a full discussion of these results, but reference will have to be made to them under A 503·7 and A 567·3, in Table I. below, for which the observations were mainly undertaken. In the meantime, observe that music for choruses should *not* be written for the average or mean limits, as probably one half the chorus could not reach those limits easily, and those that could would be distressed by them if they occurred frequently. But it is always safe to write from the actual highest form of the lower limit to the actual lowest form of the upper limit. Thus, it would not be safe to write for soprano choristers from the mean 4 F 180·2 to the mean 1 B 993·2, but it would be quite safe to write from the higher actual form of the lower limit, 4 PB 253·4, to the lower actual form of the upper limit, 1 SG 704. But even then, long frequent sustained and forte passages involving these notes would distress. Taken in the last-named form, the limits will be found to agree better with Randegger's. (See Appendix, No. 3.)

Art 22. *Materials.*—Having learned how to measure pitch with tolerable ease and certainty, I began by collecting all forks with a name and a

MEAN AND ACTUAL COMPASS OF THE HUMAN VOICE.

Voices observed.	Easy Lower Limit.	
	Mean.	Actual.
149 Sopranos	4 F 180·2	4 PB 253·4 to 4 PC 135·2
91 Altos	4 E *flat* 161·3	4 HA 211·3 to 4 SC 132
107 Tenors	8 G 98·2	4 FE 163·3 to 8 PD 76
125 Basses	8 E 81·2	8 HA 105·6 to 8 SC 66

Voices observed.	Easy Higher Limit.	
	Mean.	Actual.
145 Sopranos	1 B 993·2	½ SF 1408 to 1 SF 704
83 Altos	1 G *sharp* 835·7	½ PD 1216·4 to 1 PE 675·8
114 Tenors	1 C 520·8	1 PD 608·2 to 2 HE 316·9
120 Basses	2 F *sharp* 375·2	1 PC 540·7 to 2 FD 293·9

Voices observed.	Extreme Lower Limit.	
	Mean.	Actual.
173 Sopranos	4 E *flat* 161·9	4 PG 202·8 to 4 FC 130
108 Altos	4 D 147·1	4 SG 198 to 8 SB 123·8
114 Tenors	8 E 84·7	8 PB 126·7 to 8 SC 66
140 Basses	8 C *sharp* 71·6	8 PF 90·1 to 16 PA 56·3

Voices observed.	Extreme Higher Limit.	
	Mean.	Actual.
173 Sopranos	½ C *sharp* 1124·4	½ HA 1690 to 1 PG 811
105 Altos	1 B *flat* 951·6	½ SG 1584 to 1 PF 721
112 Tenors	1 D 616·9	1 PG 811 to 2 SG 396
139 Basses	2 B *flat* 482·9	½ PC 1081·4 to 2 SE 330

RANDEGGER'S STATEMENT OF LIMITING TONES EXPRESSED IN NUMBER OF VIBRATIONS.

REGULAR.

Voice.	Lower Limit.	Upper Limit.
Soprano	4 B *flat* 236·4	½ C 1061·2
Mezzo soprano	4 G 198·8	1 B *flat* 945·4
Alto	4 E 167·2	1 F 708·4
Tenor	4 C 132·6	2 B *flat* 472·7
Barytone	8 A *flat* 105·0	2 F 354·2
Bass	8 F 88·6	2 E *flat* 315·5

EXCEPTIONAL.

Voice.	Lower Limit.	Upper Limit.
Soprano	4 B *flat* 236·4	½ F 1416·8
Mezzo soprano	4 G 198·8	½ C 1061·2
Alto	4 E 167·2	1 G 795·0
Tenor	4 C 132·6	1 C *sharp* 562·2
Barytone	4 F 88·6	2 G 397·5
Bass	8 D 74·5	2 F 354·2

date to them, and others which, though impossible to fix to a certain place or date, yet represented a known note, and had, undoubtedly, considerable antiquity. The Society of Arts put their foreign forks at my disposal. Mr. Hipkins was most kind in allowing me to measure extremely valuable forks, and in procuring others for me. The Rev. G. T. Driffield allowed me to copy his Handel's fork. Frau Näke, of Dresden, sent over some very curious forks collected by her late husband. Prof. Rossetti, of Padua, procured me exact copies of interesting forks from Padua and Verona. Mr. Blaikley, of Boosey's, lent me a set of forks, formerly belonging to Prof. Faraday. Dr. W. H. Stone lent me others which had been tuned for him. I also procured copies of forks preserved in the Conservatoire at Paris, and had others tuned at known temperatures to remarkable organs in Vienna, Dresden, and Hamburg. These forks form the nucleus of my materials. But forks, as already mentioned, are only about a century and a half old, and it was necessary to go much further back than that, to meet the second objection raised against my former paper. Hence, I measured the pitch of numerous organs, which seemed to be untouched, and when organs failed, I was indebted to the kindness of organ builders for letting me measure the pitch of solitary pipes which they had preserved from organs they had rebuilt. Even these, however, often failed, and then I had recourse to measures of organ-pipes recorded in old books, as Schlick, 1511; Praetorius, 1619; Mersenne, 1636; Tomkins, 1668; Bédos, 1766, and others;[8] and from these and other measures Mr. Thomas Hill, of Messrs. Hill and Sons, kindly constructed pipes, which he not only allowed me to measure on his voicing machine, but most liberally presented to me. When even these failed, I had to trust to the memory of organ builders and organists as to certain organs being "flat" or "sharp," to which rather vague terms my researches enabled me to give a somewhat definite shape. This forms my own personal collection of materials. For the rest I had to trust to others, but I always endeavoured, at least, to trace their statements to the original source, and see how they obtained the pitch they give. In the first rank of these stands Scheibler himself, with about a dozen pitches, and the late Herr Näke, of Dresden, who used Scheibler's forks, and whose measures, where I could repeat them, were found very correct. Next comes Delezenne, whose method has been already explained, and whose work was excellent. Lissajous's results, believed to have been obtained with the siren and constant pressure bellows, stand, perhaps, next, but many of these are given only on the authority of de la Fage and others, and some are, perhaps, concealed in the report of the French Commission. The older determinations of Dr. Robert Smith (of Trinity College, Cambridge), Fischer (of Berlin), Euler, Marpurg, and Sauveur, were also examined.

From all these sources I have formed the large collection of pitches given in Table I., with every necessary particular respecting each, arranged by order of the pitch of A, and afterwards in Table II., by countries and places.

These two Tables, in fact, form my "history of musical pitch," but they require a little previous explanation to show their import and relations. Whenever, in future, I cite a pitch as A 505·8, reference should be made to that number in Table I., where all particulars respecting it will be found. This will save many repetitions. Table II. forms an index to Table I., as the pitch of A can be found by referring to the country, or place where it was used, and then by consulting Table I., all the other information I can furnish will be obtained.

The following condensation of these two Tables,

[8] *Titles of Old Books used as Authorities.—Schlick.* "Spiegel der Orgelmacher und Organisten, allen Stiften und Kirchen so Orgel halten oder machen lassen hochnutzlich, durch den hochschen Organisten artlich verfasst." (Mirror of Organ-builders and Organists, very useful to all foundations and churches which possess or order organs, excellently composed by Master *Arnold Schlick*, Organist to the County Palatine.) Reprinted from the only known copy belonging to Herr Wilh. Bethge, junior, and printed, apparently, by Peter Schöffer, in Mainz) in the "Monatshefte für Musik-Geschichte herausgegeben von der Gesellschaft für Musikforschung" (Monthly Journal for Musical History, edited by the Association for Musical Investigation.) First year, 1869, edited by Rob. Eitner, Berlin, pp. 78—114, with a *fac-simile* of the title, containing an engraving of an organist playing on the organ, with the bellows-blower behind it; in front, a performer on a rude oboe, and two men and three boys singing from musical notes. There is no date to the book, but the Imperial Privilege to print is dated 3rd April, 1511. The second chapter "speaks of the dimensions of pipes, a good church measure, convenient to sing to, and for the organist to play," and the eighth chapter tells "how, and at what time, the organ should be tuned." This very interesting book, which was of great use in showing the relation between very high and very low church pitch, and the method of tuning before the invention of the mean-tone temperament, was lent to me by Mr. A. J. Hipkins.

Praetorius. "Syntagmatis Musici, Michaelis Praetorii C. Tomus Secundus de Organographia." (Second volume of the Musical Work of *Michael Praetorius C.*, concerning Organ description.) "Wherein" (translating the title) "the Nomenclature, Intonation, and Properties of all Musical Instruments, old and new, not only foreign, barbarian, rude, and unknown, but also domestic, artistic, lovely, and known instruments, together with an exact Figure and proper Counterfeit of the same; and also an exact description of Old and New Organs, Manual and Pedal Keyboards, bellows, specification and Stops, and also how to tune perfectly and easily the Regale and Clavicymbalum, and what has to be attended to in delivering over an organ, together with an appended copious index; not only very useful and necessary to Organists, Instrumentalists, Organ-builders, and Instrument-makers, and all who are devoted to music, but also very entertaining and elegant reading for Philosophers, Philologists, and Historians. To which is added a complete Index. Printed at Wolfenbüttel, at the house of Elias Holwein, printer and type-founder to the Prince of Brunswick. Published by the Author. Anno Christi, M.DC.XIX." Three small quarto volumes of this very rare and curious book exist, of which the above is the title of the second. Extracts from this book were first sent me by Herr Schmahl, Organist of St. James's Church (St. Jacobikirche), Hamburg, to whom I am much indebted for kind assistance. A complete copy (with the exception of one leaf of engravings), the only one, so far as I am aware, in the United Kingdom, exists in the Reid Music Library, attached to the Chair of Music in Edinburgh, and for six months' loan of this work, which has proved to be most essential to my investigations, I am indebted to the great kindness of the Professor of Music at Edinburgh, Sir Herbert Oakeley.

Mersenne. "Harmonie Universelle, par Marin Mersenne, de l'Ordre des Minimes." Paris, 1636. Folio. In British Museum.

Mersenne. Harmonicorum Libri xii., in quibus agitur de sonorum natura causis et effectibus: de Consonantiis, Dissonantiis, Rationibus, Generibus, Modis, Cantibus, Compositione, orbisque totius Harmonicis Instrumentis, authore F. M. Mersenno Minimo. 1648. In the British Museum and Library of the Royal Society. This is a Latin abridgment of the French book, from which it varies in part.

Tomkins. For this book see under A 474·1 in Table I.

Bédos. "L'Art du Facteur d'Orgues, par Dom François Bédos de Celles, Bénédictin de la Congrégation de Saint Maur, dans l'Abbaye de Saint Denys, en France, de l'Académie." 1766. The finest and most complete work existing on the construction of the organ, of which J. G. Töpfer's work is principally an abridgment with borrowed plates. In the British Museum. Reprinted almost completely in the very cheap "Facteur d'Orgues" of M. Hamel, forming part of the "Encyclopédie Roret," Paris, 1849, to which all that is new in Töpfer, and much modern matter, are added.

For temperament, also, I have had to consult—

Zarlino. "Le istitutioni harmoniche, del reverendo M. Gioseffe Zarlino di Chioggia." Venice, 1562. In the British Museum and Library of the Royal Society.

Salinas. Francisci Salinae Burgensis, abbatis Sancti Pancratii de Rocca Scalegna, in regno Napolitano et in Academia Salmanticensi Musicae Professoris, de Musica, libri septem. Salamanca, 1577. In the British Museum.

The titles of many other works which I have consulted are given sufficiently where they are cited.

in which the arrangement is by equal semitones, and tenths of equal semitones, from a lowest ideal pitch to the highest found, and also by the nearest whole number of the vibrations made by the single note A in one second, for a few of the principal and most characteristic pitches, with the designation of the classes into which I distribute them, will probably make it more easy to follow the remarks I have to make, while the filling up of details by Tables I. and II. themselves will give that feeling of confidence which can only arise from a most extensive induction.

Outline History of Musical Pitch.

S	A		
0·0	370	Ideal lowest, or zero-point.	Church Pitch lowest.
0·2	374	Hospice Comtesse, 1700.	
0·3	377	Schlick low, 1511; Bedos, 1766.	
1·0	392	Euler's Clavichord, 1739.	Church Pitch low.
1·1	395	R. Smith, 1759; Roman pitch pipes, 1720	
1·2	396	De Caus, 1615; Versailles Chapelle, 1789	
1·4	403	Mersenne Spinet, 1648.	Chamber Pitch low.
1·6	407	Sauveur, 1713.	
1·7	408	Mattheson, Hamburg, 1762.	
1·7	409	Pascal Taskin, court tuner, 1783.	
2·0	415	Dresden chained fork, 1722.	European Mean Pitch for two centuries.
2·2	420	Freiberg, 1714; Seville, 1785.	
2·3	422	Mozart, 1780.	
2·3	423	Handel, 1751.	
2·4	424	Praetorius's suitable pitch, 1619; original Philharmonic, 1813.	
2·5	428	R. Harris, 1696; Opéra Comique, 182-	
2·7	433	Sir George Smart's fork, 1828.	Compromise Pitch.
2·8	435	French Diapason Normal, 1859.	
3·0	440	Scheibler's Stuttgart Standard, 1834.	Modern Orchestral Pitch, and *Ancient Medium Church Pitch.
3·1	442	*Bernhardt Schmidt, low, 1690.	
3·2	445	Madrid, 1858; San Carlo, Naples, 1857.	
3·2	446	Broadwood's Medium, 1849; French Opera, 1856; Griesbach's A, 1860	
3·4	449	=C 534; Griesbach's C 528, 1860.	
3·5	451	Lille Opera, 1848; British and Belgian Army, 1879.	
3·5	453	Mean Philharmonic, 1846-54.	
3·6	455	Highest Philharmonic, 1874; Broadwood, Erard, and (English) Steinway, 1879.	
3·6	456	Vienna, high, 1859.	
3·7	457	(American. Steinway, 1879.	
3·8	458	Great Franciscan Organ, Vienna, 1640	Church Pitch high.
4·0	466		
4·3	474	Tomkins, 1668; B. Schmidt, high, 1683	
4·5	481	St. Catherine's, Hamburg, 1543.	
4·8	489	St. James's, Hamburg, 1688.	
5·0	494	St. James's, Hamburg, 1879.	Church Pitch highest.
5·1	496	Rendsburg, 1668.	
5·3	504	Schlick, high, 1511; Mersenne, ton de chapelle, 1636.	
5·4	506	Halberstadt Cathedral, 1861.	
6·0	523		
7·0	554		Chamber Pitch highest.
7·3	563	Mersenne, ton de chambre, 1636.	
7·4	567	Praetorius, North German, very old.	

Art 23. *Early Church Pitch* (*Ton de Chapelle*, *Chorton*).—No doubt, the earliest musical instrument was the human voice, and the old lyres and flutes were merely arranged to steady it, and to give it such a pitch that its strains should not run beyond its compass. We have a notable instance of the latter use in the flute-player of Tiberius Gracchus, who always stood near him to give him the proper pitch of his voice. (Cicero de Oratore, lib. iii., §§ 225-228.) But with these ancient times I have nothing to do. I take up music at a point where the Pythagorean or Ptolemaic scale, or some of the numerous unequal temperaments, had been applied to church music for many years, and the pitches used can be compared with those now prevalent, because there was a practical agreement of notation and relative intonation. Also with those old instruments which were not intended to be played with any others, and which were consequently intoned simply in the way which was thought to bring out their quality of tone best, as Praetorius tells us, I have nothing to do.[9]

The pitch-pipe was the most natural instrument for starting the voice, and I have the impression that those primitive little organs, of which Praetorius speaks (*ib.*, vol. 2, p. 94), which were hung up against a column in the church, "like swallows' nests," as he says, and contained only the notes B *natural*, C, D, E, F, G, A B *natural*, C, D, E, F, or else the notes C, D, E, F, G, A, B *flat*, C, D, E, F, G, A, which have the appearance of a series of pitch-pipes, set to the proper notes, were really so, that is, were as much the development of the pitch-pipe, as the clavichord is well known to have been the development of the monochord. But to the pitch of these little instruments I have no clue.

I begin with the great organ of the cathedral of Halberstadt (29 miles S.W. of Magdeburg, in Prussian Saxony), finished on 23rd February, 1361, by Nicholas Faber, and restored, 1495, by Gregory Kleng, which was still existing, though no longer used, in the days of Praetorius, 1619, who has described and partly figured it. Praetorius gives the dimensions and name (B *natural*) of the largest pipe, from which I had a model constructed to a scale of one-sixteenth, which speaks four Octaves higher, and gives 4 B 284·5, whence J A 505·8, which sounds more like 1 C than 2 A. This is the sharpest pitch which I have measured, but not the sharpest which I have met with. It is nearly a whole tone sharper than the sharpest pitch now used in London.

Practically belonging to nearly the same period, although, possibly, one or two centuries later, is the C of an ancient organ at L'Hospice Comtesse, near Lille, measured by Delezenne, and giving 4 C 112·7, whence A 374·2.

Now, these two pitches, A 374·2 and A 505·8, are S 5·22, or a comma more than an equal Fourth apart and it requires considerable faith to believe that sounds so extremely different could ever have been conceived and written as the same note A. But a key to the mystery is furnished by Arnold Schlick, 1511, who says (chap. 2):—"The organ is to be suited to the choir [or church, *chor*], and properly tuned for singing, for where this is not considered, persons are often forced to sing too high or too low, and the organist has to play the chromatics, which is, however, not convenient for

[9] *Ancient Pitch of Solo Instruments.*—"In the first place, it must be known that the pitch, both of organs and other musical instruments, varies greatly. Since the ancients were not accustomed to play in concert with all kinds of instruments at the same time, wind instruments were very differently made and intoned by instrument makers, some high and some low. For the higher an instrument is intoned in its own kind and manner, as trumpets, shawms, and treble viols, the more freshly they sound and resound. On the contrary, the deeper trombones, bassoons, bassaneldi, bombards, and bass viols are tuned, the more majestic and magnificent is their stately march. Hence when the organs, positives, clavicymbals, and other wind instruments do not stand in the same pitch with each other, the musician is much plagued."—Praetorius, "Syntagma," vol. 2, p. 14.

everyone. But what is the proper length of the pipes for this purpose, and convenient to the choir to sing to, cannot be exactly defined, because people sing higher or lower in one place than in another, according as they have small or great voices. However, if the longest pipe, the F below the Gamma-ut in the pedal [that is 8 F below 8 G, the Gamma-ut being the name given by Guido Aretino to 8 G, the note on the last line of the bass staff], has its body down to the [beginning of the] foot, sixteen times the length of the annexed line [which the editors say is 4 and 7-8 Rhenish inches = 127·5 mm. long, so that the full pipe is 6½ Rhenish feet, or 2040 mm. long], I think it will be a suitable length for the choir. But if you build an organ a Fifth larger, then you must make C in the pedal [that is, 8 C, the lowest note of the violoncello], of this length. . . . The reason is that a greater part of church music ends in *grambus* [a word which puzzles Schlick's editor, who says, however, that it can only mean the transposition of the *tonus primus* by a Fourth], than in the first tone." And he proceeds to show its advantage, and especially the advantage of the first pitch (with 6½ Rhenish feet to 8 F) in other ecclesiastical tones. Assuming that when Schlick's pipe was taken two Octaves higher, its diameter would be one-thirteenth of its length, which is not improbable, although, perhaps, it is rather narrow, I had such a pipe made, and then measured it, and found its pitch to be V 301·6. If we assume this as 2 F, and, taking 2 A a perfect major Third above (and Schlick's directions for tuning made this major Third very nearly perfect), we obtain as the pitch A 377, which is practically the same low pitch as Delezenne's Hospice Comtesse A 374·2. But if, as in Schlick's greater organ, we assume the 6½ Rhenish feet for 8 C, we obtain A 504·2, which is practically identical with the Halberstadt A 505·8, and is parallelled by the actually existing organ of St. James's Church (*S. Jacobikirche*), at Hamburg, A 494·5, as now tuned, but formerly A 489·2. Hence, we have both the very sharp and the very flat pitch recommended by the same writer, at the same date, and on the same grounds, namely, the accommodation of the singer and the organist in playing the old ecclesiastical tones.

This gives the first three principles which seem to have determined early pitch, namely (1) ecclesiastical music, (2) ease of fingering it, (3) the compass of the human voice. To this we must add a fourth, and very important principle, which seems to have had great influence in practical construction, namely (4) the foot-rule of the country. It is clear that organ builders would naturally choose for their chief standard pipe some easy multiple or sub-multiple of the foot-rule with which they worked, as they could not well make their men attend to any other. The old organ builders divided the pipes into Octaves of so many feet each. In Art. 5 I adopted this division as the most generally received nomenclature of the great scale, for it is found, not only all over England, but also all over Germany, France, and Italy, despite the variety in the length of their feet. Although it has long ceased to be anything but a name, and does not at all signify the real dimensions of the pipes, being as much a survival as our own English spelling, it must, like that spelling, have had an original foundation in fact; and in Dom Bédos's great work on the organ, 1766, we find this division a reality, the 4 foot C being really a pipe of 4 old French feet in length, and so on. Now, for the same "scale" (that is, the same ratio between the diameter and length of the pipe), the pitch varies inversely as the length of the pipe, and much of the older diversity of pitch seems to me referable to the old diversity of measures. The following are the principal foot measures which have to be considered, expressed in millimètres to the nearest unit (25·4 mm., being one English inch):—

	m m.
Long old French foot, or *pied de roi*	325
Long German, or Rhenish foot	314
Long Austrian foot	316
English foot	305
Old Nurnberg foot	304
Old Roman foot (medieval).....	295
Old Augsburg foot	296
Bavarian foot.....	292
Short Saxon foot	283
Short Brunswick and Frankfort foot....	285
Short Hamburg and Danish foot	286
Very short old Brabant foot of 11 inches	278
13 Rhenish inches.....	340
13 Saxon inches.....	307
12 old Brabant inches	303

Now, a difference of 12 per cent. in the lengths of two pipes will, for the same scale, make a difference of nearly a whole meantone in their pitch. Thus the short Saxon foot was a meantone sharper than the long Austrian or Rhenish foot.

Again, 6 per cent. corresponds to an equal semitone, 3 per cent. to an equal quartertone, 5¾ per cent. to a semi-meantone, 4½ per cent. to a small, and 7 per cent. to a great, meantone semitone. Thus we see that the English foot is nearly a great semitone sharper than the French foot, and the Rhenish foot is about a small semitone sharper than the French, and the English about an equal quarter of a tone sharper than the Rhenish. Throughout Germany, there was a great variety of small feet, quite sufficient to account for a great variety of organ pitch.

The flat pitch took the most root in France. Dom Bédos says that chapel pitch was constant, and he draws and describes his pipes, proceeding by French feet, giving A 376·6, which is 2½ equal semitones flatter than the French diapason normal of 1859. The Rev. Sir F. A. Gore Ouseley, who has examined a large number of the continental organs, informs me that "most of the old *untouched* organs in the French cathedrals are of this low pitch" (see A 376·6). The English foot is a semitone sharper than the French, and the only English example of an organ in which C is 1, 2, 4, &c. feet, is that furnished by Trinity College organ in 1759, A 395·2, which is nearly three-quarters of an equal semitone sharper than Dom Bédos's A 376·6. In Germany, the low pitches I have found are few, Schlick's A 377, already noticed, and Salomon de Caus's A 396·4, which is sharper than the French, because the Rhenish foot itself is a quarter of a tone sharper.

On the other hand, the sharp organs are principally German, the Halberstadt A 505·8, Schlick's high A 504·2, and the existing pitches of the organ in the cathedral at Lübeck A 484·1, and the Hamburg churches of St. Catherine A 480·8, and

St. Jacobi A 494·5. In England, we had Tomkins's high pitch A 474·1, realised in Bernhardt Schmidt's old Durham organ, 1683, arising from placing the pipe, of one English foot in length, on A, which evidently belongs to this series. In France, Mersenne places the French four-foot pipe on 8 G for the *ton de chapelle*, giving A 503·7, agreeing with the Halberstadt. In Italy I found, preserved at the University of Padua, a 1 G made for Prof. Stratico, which would imply A 483·7, but whether it represented a pitch really used I do not know. The above high and low pitches seem to me to belong to this earliest period of church pitch; the other low and high pitches appear to have been influenced by other considerations, after the tradition of the older pitch had died out.

Art. 24. *Early Chamber-pitch (Ton de Chambre, Cammerton).*—Music was by no means all ecclesiastical. When choirs were formed for the church, and musical instruments were introduced to play with the organ, forming the German *Kapelle* (properly "chapel," but afterwards merely "band"), both choir and instruments were used by the king or prince to perform in his "chamber," that is, his private apartments, for his private gratification. But the music they wanted to play and sing far exceeded church requirements, and hence the old church pitch hampered them; it was generally either too high or too low. But as one set of instruments was wanted both in the church and the chamber—I have only heard of one place, Dresden, in which two sets of instruments were used (see A 424·0, and 437·8)—it was necessary that the chamber pitch should bear a definite relation to the church pitch; in other words, that it should differ from it by an interval of the scale. For this reason, apparently, chamber pitch differed from church pitch by a semitone, a Tone, or a minor Third, or even a Fourth, according to the pleasure of the performers. Dom Bédos says (Art. 1140), that church pitch in France was fixed, but that the opera pitch (an advance on the chamber pitch) is not fixed, but ascends, or descends, a quarter of a Tone, or even more, according to the compass of voice. This, as well as the instruments which happened to exist in any place, had doubtless much to do with the great variety and confusion of the chamber pitch. It seems that, as a rule, this pitch tended towards a certain mean, by being a tone higher than the low pitches, and a minor Third, or even a Fourth lower, than the very high pitches. This, however, was not always the case. Mersenne's high church pitch is capped by his still higher chamber pitch, A 563·1, produced by putting the 4 (French) foot pipe on to 8 F. To modern ears, it would amount to transposing the bass by a Fifth, to allow it to be sung by a tenor, but it was evidently not so considered by Mersenne. We find, probably, as high a pitch, called chamber pitch, in Praetorius. (See A 567·3.) Of course, we have very few direct traces of ancient chamber pitch. But the fact that St. Jacobi organ at Hamburg (formerly A 489·2 now 494·5), had for many years one stop, which was a minor Third flatter than the rest of the organ, that is, a little lower than the old pitch of the Dresden organ, A 415, and that this stop (long since replaced as useless) was said to be in chamber pitch, serves to show an indirect action of chamber upon church pitch. This stop evidently enabled the organist to play with the instruments occasionally without transposition. At present the organists of St. Jacobi and St. Catherine, at Hamburg, have always to transpose a Tone or a semitone at sight, a state of things that certainly was not contemplated when their church pitch was settled.

Art 25. *Influence of Chamber-pitch on Church-pitch.*—The direct effect of chamber on church pitch was evidently the building of organs in chamber pitch, or the retuning of old organs in that sense. This came to placing the standard lengths of pipe upon different notes, or shifting the existing pipes into different holes, so as to be actuated by keys a Tone or a Semitone different from those by which they were before evoked, and then supplying the required extra pipes, and trimming the old pipes for temperament. We have some conspicuous examples of this shifting, which is a very common device of organ builders at the present day. Thus the pitch of Trinity College organ was altered from A 441·7 to A 395·2, by shifting in such a way that the C pipe was made to speak to a D finger-key. The organs of the Temple and St. Paul's were altered from A 441·7 by shifting a semitone and then piecing when required to bring them probably to Sir George Smart's pitch A 433·2, which is practically identical with the modern French pitch. But, the flattening of St. Paul's proving disagreeable, after some years the pipes were shifted back again and retrimmed, so that the original pitch was restored. The present organ is new, by Willis, but is almost exactly in the first pitch (see A 444·6). The pitch of Durham Cathedral and St. James's Chapel Royal organs were altered in the same way (see A 474·1). It is evident that in such changes the traditions of church pitch were set at naught.

The changes of course differed in different countries. In France, to give the one foot French pipe to B *natural* produced A 395·8, which we find in the chapel of Versailles, and which is practically identical with putting the one foot pipe upon C at Trinity College, where B *flat* became C, producing A 395·2. I have no other certain indications of such a proceeding in France, because all the organs which Delezenne examined, except that of the Hospice Comtesse, which was in the oldest flat pitch, A 374·2, had been more or less repaired. The St. Sauveur, Lille, A 384·6, looks merely to be the old pitch with the pipes cleaned and "trimmed;" La Madeleine, Lille, A 398·7, seems, however, to be a similar alteration of an organ with the French foot on B. Mersenne's spinet, A 402·9, had its lowest note, 8 B, tuned to the 4-foot pipe. The V 7·1 difference between this and the Versailles A 395·8, may be merely a matter of temperature or scale. Let us briefly class these organs as French C foot and French B foot organs.

In England, we have this formation very marked. The old English A foot organ, A 474·1, belonged to the old sharpest organs, such as Tomkins's and Bernhardt Schmidt's high pitch at Durham, and at the old Chapel Royal, St. James's. The B *flat* foot organ, a great semitone lower, gave Bernhardt Schmidt's low pitch A 441·7, which, with a change of temperament, seems to be the favourite church-pitch among London organ-builders at this day. (See Gray and Davison's

A 440, Walker's 440·2, Bevington's A 440·5, Lewis' A 441, Hill's 441·7, Bryceson's 443·4, Willis's church-pitch, A 445·2.) The B foot organ, which, for 200 years, found the most favour in England, had two distinct forms: the *wide scale*, deduced immediately from Bernhard Schmidt's, and giving Green's A 422·6 or A 423·2; and the *narrow scale*, used by Renatus Harris, giving A 427·7 or 427·2, 434·7, or even A 419, according to pressure, &c. The C foot organ never seems to have found favour with us, although it is possible that Bernhardt Schmidt built some chamber organs at that pitch. (See A 395·2.) The alteration of the Trinity College organ to this pitch is attributed, by Dr. R. Smith, to the influence of Roman pitch. I have not been able to find a Roman pitch so low. The lowest Italian pitch, A 403·9, derived from an old Paduan fork, is, however, only S 0·38, or about one-sixth of a tone sharper. Euler's clavichord or spinet, A 392·2, seems to have been a Russian C foot instrument (the Russian foot agreeing with the English). But from this may have been derived Euler's organ, A 418, a semitone higher; that is, as nearly as I can judge from Euler's rather vague description. Again, in England, if from a B foot organ, giving A 424·6, we form an organ a whole great semitone sharper—that is, having its A on the B *flat* of the other organ, or its B on the C of that organ—we shall get A 454·2, a pitch which I found on a very old fork accidentally dug up at Brixton. This seems, also, to be the meaning of A 457·6, the pitch of the existing large organ in the Franciscan Church at Vienna. The natural alteration of an organ was by a great semitone, B *natural* to C; the small semitone, B *flat* to B, would only arise from shifting the pipes. It must be remembered that B *flat* was the only chromatic which formed part of the original musical scale. For a table of the relations of these organs, see the end of the remarks on A 474·1.

Art. 26. *The Mean Pitch.*—The result of all these different endeavours to reconcile the requirements of the church with those of the chamber seems to have been the institution of a mean pitch, which, within very narrow limits, prevailed for a very long time over most of Europe. This was, in fact, the chamber pitch, formed by taking the D of the old flat church pitch as C, and the A (or occasionally the G) of the high church pitch also as C. It was, therefore, a whole Tone above the flattest, and a minor Third (or occasionally a Fourth) below the highest pitches. This at least, appears to me the origin of a pitch which certainly bears these relations to the older pitches, and was very widely used. In my list of Historical pitches, in Table I., 63 pitches lie between A 415, and A 430, the mean of which, A 422·5, is the exact pitch of Handel's fork, now in the possession of the Rev. G. T. Driffield, the Rector of Bow. This pitch I regard as the mean pitch of Europe during the 17th, 18th, and the early part of the 19th centuries, so important for musical art. The earliest recommendation of this pitch I find in Praetorius, 1619, in an N.B. at the end of his second volume, p. 231, where he says:

"In this second volume I have often had to speak of the true Church pitch (*des rechten Chor-Tons*). I have found that, in many places, even in large and important cities, and on their splendid organs, the proper Church pitch, by which both human voices and instruments must be regulated, was not used, but their pitch was either too high or too low, forming one of the principal defects of the organs. This has made me think of all kinds of ways and means to remedy this defect, and make the proper pitch known to both organ-builders and organists, so that the organ-builder may intone new organs, and renovate and correct old organs, by this means. For this purpose, I give a correct drawing of the proper measure for Church pitch, for the Octave beginning with what the organ-builders call the half-foot C, from which small pipes can be constructed through a whole Octave with great correctness, and used for tuning purposes by organists." Then follows a drawing, the particulars of which will be found under (1) A 424·2, the pitch I have deduced from it by having a 1 C pipe constructed from its corrected dimensions. Several little points remain in doubt, as Praetorius neglected to give the size of the mouth and the force of the wind; but the pitch measured must sufficiently represent the actual mean pitch which he finally adopted. It corresponded to the English B foot organ, and had as variations, owing to scale and pressure, from A 415 to A 428·7, besides the variations due to the original length of foot. Some of the earliest organs in this pitch are Gottfried Silbermann's celebrated Roman Catholic Church organ, at Dresden, built 1754, originally A 415, and now A 418·1; his St. Sophie, at Dresden (built 1740), A 415·5; and his organ of the Saxon Cathedal at Freiberg (built 1714), A 419·5, which, as A 419·6, is still used as the church pitch all over Spain. Singularly enough, these Saxon pitches have been regarded as remnants of the high Church pitch, and Näke assumes the existence of a chamber pitch A 375·2, a whole tone below the Freiberg Cathedral A 419·5, and belonging, really, to the early lowest church pitches. The English organ-builders, Renatus Harris, Christian Smith, Glyn and Parker, Schnetzler; Byfield, Jordan and Bridge; Byfield and Green; and Green, all, at least occasionally, used this pitch. Almost any untouched English organ in country places is a B foot organ. And when the London Philharmonic Society was founded, in 1813, and down to 1828, the pitch used was A 423·7. But the wide Continental diffusion of this pitch is most important. Marpurg's A 414·4, at Breslau in 1776, was, no doubt, really one of these pitches; probably giving A 420 when corrected. Näke cites a flute by Floth, in 1760-70, of A 418, and a D-clarinet of Grenser, in 1783, of A 422. The fork of Franz Anton von Weber (father of the celebrated composer, Carl Maria von Weber) who lived 1740 to 1812, shows A 424·1; and, at the time that C. M. von Weber himself was Kapellmeister at Dresden, 1815-21, the fork of the orchestra gave A 423·2. The pitch for which Stein, the predecessor of Streicher, constructed the pianos used by Mozart in 1780, was A 421·6, and the fork of the Saxon organ-builder Schulz (predecessor of the celebrated Schulze, of Paulusceele) who lived in Vienna in 1780, was A 421·3. The two old pitch-pipes lent me by the bell foundry Colbachini, at Padua, the first of about 1730, and the second of about 1770 show a mean of A 425·2 (which see). The higher F fork of the same house is equivalent to A 422·6; the lower F fork of the same first is equivalent to A 403·9, and belongs to another series. The old forks of the

bell foundry of Cavedini, at Verona, of which I was obligingly allowed to have accurate copies belonging to about 1780, give A 422·3.[10] And, as late as 1839, the best piano-tuner at Bologna used a fork A 425·8. In France, the old fork of François, of Lille, assigned to 1754 by Delezenne, gave A 422·6, and that of Cohen, of the same place about 1800, gave A 428·7. In 1810, Droue assigns A 423 to the Grand Opera, in Paris; and Scheibler, in 1811, assigns A 427·0 to the same. In 1824, the pitch of this opera was lowered for a special singer (Madame Branchu) to A 425·8, evidently the pitch to which she was accustomed. In 1823, Fischer assigns A 424·2 to the Italian Opera in Paris. Dauprat's fork, preserved at the Conservatoire at Paris, gives A 423 to the comic opera there in 1820, and Fischer, in 1823, gave A 427·6 to the same.

Now, from 1670 to 1820, during which this mean pitch was in full vigour, we have the following composers:—

Belgium and France.—Lulli, Rameau, Monsigny, Gossec, Grétry, Dalayrac, Leseur, Méhul Boïeldieu (operas).

Italy.—Stradella, Corelli, Lotti, A. and D. Scarlatti, Porpora, Geminiani Vinci Leo, Durante, Pergolesi, Galuppi, Jomelli, Marcello, Guglielmi, Piccinni, Tartini, Sarti, Sacchini, Farinelli Boccherini, Cimarosa, Paesiello, and earlier period of Clementi, Zingarelli, Cherubini, Rossini (all his operas), Donizetti, Bellini.

Germany and Austria.—Zachau, Keiser, Handel, Graun, Gluck, Hasse, Stamitz, J. Sebastian Bach, C. P. Em. Bach Haydn, Mozart, Beethoven, C. M. von Weber, and earlier careers of Hummel Spohr, Meyerbeer, Moscheles, Pleyel, Mendelssohn.

England.—Purcell, Croft, Green, Arne, Boyce, Burney, Hawkins, Webbe, Battishill, Shield, Stevens, Wesley, Callcott, and earlier careers of Horsley, Crotch, Bishop.

That is to say, the heroes of music, the founders and perfecters of modern musical art, all used this mean pitch, all thought out their music, and arranged their voice-parts to be played and sung in this pitch. This is, therefore, emphatically the classical pitch of music.

It was during this period that the great Cremona violins were made. Savart considered that the resonance power of the cavity of a violin, shown by the fork which utters the loudest tone when held before one of the *f* holes, was likely to be the pitch of the time, and on his authority, C 256 was the resonance of the violins of Stradivarius, and hence this maker was credited with adapting his instruments to that pitch, which was, therefore, assumed to be the pitch of their time. (See Table I., under A 384·3.) By the kindness of Dr. Huggins, F.R.S., and Rev. H. R. Haweis, together with the violin-makers, Messrs. Hart, Hill, and Withers, I have been able to examine the resonance of several fine instruments of this period, by Duiffoprugcar (Swiss Tyrol, Bologna and Lyons, 1510 1538), Amati (Cremona, 1596-1684), Ruggieri (Cremona, 668-1720), Stradivari (Cremona, 1644 1737), Giuseppe Guarneri (known as "Joseph," Cremona, 1683-1745), Lupot (France, 1750-1820), &c.

It was often difficult to decide what fork gave the maximum resonance, as the difference between two adjacent forks was often slight. And as my forks proceeded by four vibrations each, the resonance could not be determined within less than two vibrations in a second of the pitch named, either sharper or flatter. The method adopted was to hold a fork over the widest part of the *f* hole on the "bass" side of the violin, and, therefore, most remote from the "post." By far the strongest resonance lay between V 268 and V 272; but one early Stradivari, 1696, had a fine resonance at V 264. Then there was a secondary, but decidedly weaker maximum resonance about V 252. The V 256 was generally decidedly inferior. We may, then, take V 270 as the general resonance, and about 252—say 252·4—as a secondary resonance. Now, taking the doubles of these as 1 C, we obtain C 540 and C 504·8, which would give MA 451 and MA 421·9. Now, the latter represents the mean pitch of the period very closely. (Compare Cavedini's Verona A 422·3.) And the other is a great semitone above it, which is a regular difference. (Compare notes on A 454·2 and 457·6, both of which belong to this period.) These may be mere coincidences, and may have really had nothing to do with any attempt to adjust the resonance to the prevalent pitch. This is certainly the case in the making of more modern violins on the same model and with the same resonance as the old. But, if coincidences, they are, at any rate, remarkable. And the higher resonance, corresponding to modern English orchestral pitch, may account for the possibility of playing these violins with effect at our present concerts. As the resonance is not bad, although inferior, between V 252 and V 268, it is evident that these violins will also sound well with an intermediate pitch, such as the French. (See Appendix, No. 4.)

With the establishment and reception of mean pitch, the history of earlier musical pitch closes; and the extent to which I have been able to work it out, with the proofs in Table I., will, I hope, be accepted as an answer to the second objection raised against my former paper. It is necessary, however, to show the gradual passage of a universally accepted mean pitch into the lamentable conflict and confusion of pitches which now exist, and this my recent researches enable me to do more completely than before.

Art. 27. *Orchestral Pitch.*—During the latter part of the reign of mean pitch, a new power was showing itself in music—the orchestra, including the opera. Both church and chamber pitch were founded on the capabilities of the human voice alone, and the instruments were accessory. But the formation of large orchestras, for which especial music was written, gave an excessive

[10] *Ancient Variability of Italian Pitch.*—Carlo Gervasoni, of Milan, in his "La Scuola della Musica," Piacenza, 1800, p. 126, footnote, says, "The tone, commonly called Pitch [*Corista*, a word also used for a pitch-pipe and a tuning-fork, although *diapason* is now also employed for the latter] is not the same in all cities, but in some it is higher or lower than in others. The pitch of Rome is, in fact, much lower than that of Milan, Pavía, Parma, Piacenza, and all the other cities of Lombardy, and the pitch of Paris is not only sharper than that of Rome, but much sharper than that of Lombardy. A mean pitch (*un corista di mezzo*), which is more generally accepted, is, nevertheless, that of Lombardy, and with this agree, more or less, the pitches of various provinces." The Lombardy pitch, then, may be taken as A 422·6, and the lower Roman as A 403·9 or A 395·2. As to the pitch of Paris, about 1800, the nearest I have are, for the Grand Opera in 1810, A 423; in 1811, A 427; in 1819, A 434; and for the Conservatoire in 1812, A 439·5, and Lemoine's fork 1810c, A 430—it would seem that the nearer we get to 1800 the nearer we are to the Lombard pitch. Näke, however, makes the Lombard pitch flatter (see A 415·5 and A 419·5 in Table I.). Still it would appear to have been within the limits of the mean pitch.

power to the instruments, which could develop their powers independently of the voice, and then, when joined with the voice in operas, could often exercise—have certainly, often cruelly exercised—a tyrannical power over the voice.

Down to 1816 in Austria, and later in most other places, mean pitch held undisputed sway. The most serious outbreaks against it I can find are: the French Conservatoire, which in 1812, according to a fork preserved at the Conservatoire itself, used A 439·5 (nearly three-quarters of a semitone sharper than mean pitch), and two very doubtful pitches, not precisely specified, measured in 1815 by De Prony, as A 438·2 and A 444·5. The former I look upon as an individual freak, for which I find no contemporary corroboration so that I presume the pitch was confined to the Conservatoire, and may have been only a temporary trial. The other two are laboratory experiments, and, from all the circumstances under which they were made, I cannot attach much historical value to them. It was not till after 1816 that any general rise took place and slowly spread.

According to Schindler ("Niederrheinische Musik-zeitung," 1855, Nos. 8 and 9), as quoted by Näke ("Ueber Orchesterstimmung," 1862, p. 26)—and the same story is given in the Report of the French Commission, as sent to it in a letter by M. Kittl, director of the Prague Conservatoire—the rise began at the Congress of Vienna, when the Emperor Alexander of Russia, who was colonel of an Austrian regiment, presented it with a new set of musical instruments, made by Stephan Koch, which were sharper than the mean pitch; and, under the direction of Hieronymus Payer, this band became very noted for the brilliancy of its tones. But, when its assistance was required in performing an oratorio for the return of the Emperor Francis, it was found impossible to make use of it, and much talk thence arose. In 1820, the band of another regiment (Hoch- und Deutschmeister-Infanterie) received new instruments, which were even sharper than the other. The Vienna theatres were in great trouble; for, whereas it was usual to call in the assistance of the military bands for great operas, two out of three of the regiments quartered in Vienna were no longer available, so that only one extra band remained for the theatres. The result naturally was that the theatres had ultimately to raise their pitch also. In 1823, Näke puts down Weber's "Euryanthe" as having been performed to A 437·5, and in 1834, Kreutzer's "Nachtlager" to A 440, both in Vienna; and notes (from his own hearing, apparently) A 466 as the actual pitch of the Vienna opera in 1861, during performance, which would be sharper than that officially recognised. Thus, the fork in possession of the great pianoforte-maker, Streicher, of which a copy was kindly sent to me, was only A 456·1 before 1859. The transitional pitches, A 433·9 to A 445·1—which last was regarded as a monstrosity—are noted by Scheibler before 1834. Once set the ball in motion and instrument-makers keep it well up. Yet, heightening the pitch of wind instruments does not generally improve their quality of tone; they lose richness and roundness, and incline to scream; but it is continually the wind instruments which force the pitch up.

The Vienna sharpening took some time to spread to Dresden, but Herr Näke, a Dresdener, says that in 1821 the celebrated flutist there, Herr Fürstenau, obtained a sharp flute from Koch, in Vienna. These flutes, with additional keys, were much in vogue, but they drove the orchestra up. However, Dresden did not emulate Vienna; for, as late as 1826, the fork of Kapellmeister Reissiger was only A 435; and, although Näke reports A 446 in 1861, the officials (especially Herr Moritz Fürstenau, the librarian, who has been very kind in helping me) declare that they are all perfectly unaware of such a pitch. They profess to use A 440, but the forks I have measured are one or two vibrations lower, as A 438·9, 439·4, and 437·8. It is, however, often the case that the orchestra, by heating up, plays sharper during performance, as I have just noted. See, for an excellent example, A 449·7, generated from A 445·6 at Covent-garden opera in 1879. This is a good reason for using a comparatively low pitch, for the singer's voice does not sharpen in the same way, but has rather a tendency to flatten as it becomes weary with much singing.

The Austrian influence was, of course, greatly felt in Italy, and in 1845 we find the Italian pitches at Florence, A 436·7; Turin, A 439·9; and at Milan, A 446·6, where it increased in 1856-7 to A 450·3 and A 451·7. In 1869, the information officially communicated to the Society of Arts, gave Vienna pitch (meaning, possibly, A 456·1) to Florence, Venice, and Naples. Bologna, which sent a fork, was flatter, showing only A 443·1. There was, in fact, complete want of agreement.

Although the elevation of pitch took some time to accomplish in Dresden—where it, after all, remained tolerably low—it seems to have proceeded much further and faster in Leipzig, where the celebrated Gewandhaus concerts were held, and where, in 1859, I find A 448·8, and, in 1869, nearly the same, A 448·2. A fork, sent officially from the late Kapellmeister Rietz, from Dresden, to the Society of Arts, in 1869, as the Dresden pitch, A 449·4, seems to have been a Leipzig fork sent by mistake.

In Berlin, it was some time before the sharpening influence was felt. In 1806-14, Wieprecht reports A 430·5, possibly an error in calculating an equally tempered A from C 512, instead of MA 428, which would belong to the mean pitch; but I have not been able to see the original statement. Fischer, in 1822, found A 437·3; in 1830, Berlin reached A 440; and, in 1834, according to Scheibler, A 441·6. After this, progress was rapid, and in 1858, A 450·8; in 1859, A 451·8 was reached.

The whole of the German and Italian pitches were thrown back in 1859 by the introduction of the French Normal A 435·4, of which I shall have to speak in the next article.

In France, the pitch rose gradually at first. The Grand Opera was A 434 in 1819, and only A 431·7 in 1822. In 1824, however, a singer, whose voice was failing (Madame Branchu), insisted on restoring the old pitch, A 425·8, and it was five years before the opera returned, in 1829 to A 434. According to de la Fage ("De l'Unité' Tonique," 1859, additional notes, p. 7), this recovery of pitch was undesigned. A single horn-player, Jean Mengal, without consulting any one, shortened his horn, and his companions either returned to their old sharper instruments or cut down their new ones. It was another case of sharpening due to a wind instrument. Of course, it is the duty of the conductor to prevent such

freaks, but conductors seem to prefer avoiding squabbles with instrumentalists; and not to care if the singers' voices are strained, and rapidly ruined. A curious thing occurred at this time at the Grand Opera in Paris. The pianos used for rehearsals had been lowered when the pitch of the opera was lowered in 1824, and were not raised when the pitch of the opera was raised; thus, in 1829, we find the pianos at A 425·5, and the orchestra at A 440, both pitches being taken from forks verified by the tuner Monneron for de la Fage. Finally, in 1856, the Grand Opera was at A 445·8, or A 446·2, and, in 1858, at A 448. The Italian and the Comic Opera had nearly reached the same figure, and the Conservatoire also, A 446·2, according to de la Fage. The provincial French operas were generally high —as Lille, A 450·5, or 452; and Marseilles, A 447— and Pleyel's pianos were at A 446. This pitch began to frighten French musicians, and the French Commission was issued in 1859, of which I shall speak presently. Since that time, French pitch has been, nominally, A 435; what the actual pitch of the opera is, during performance, I have not been able to ascertain, but probably a little higher.

Belgium, which, in 1859, had the sharpest pitch known to the French Commission, namely, A 455·5, which it seems to have used only for military bands; and their director advocated a lower pitch for operas, as (3) A 442·5. The pitch of the Belgian Army bands is now nominally A 451, (the fork actually sent to Dr. W. H. Stone by M. Victor Mahillon was A 451·7 practically identical with Dr. Stone's British Army Regulations A 451·9). (See Appendix, No. 10.)

In London, the progress has not been so rapid, and it has been once or twice checked. In 1813, the Philharmonic Concert, opened with A 423·7—that is, in mean pitch—and retained it till 1828. It is supposed to have been fixed by the conductor, Sir George Smart, after a consultation with singers. But, about the year 1828, he altered his fork to A 433·2, which, as he used meantone temperament, gave MC 518·2, or almost exactly the modern French EC 517·8. This became the pitch commonly known as "Philharmonic," and was generally represented by forks sold in music-shops from 1840 to 1846. It was one of these forks (C Philharmonic 518), that Mr. Hopkins used when he examined the pitch of the Lübeck, Hamburg, and Strasburg organs, as I have ascertained by measuring the fork itself (see "The Organ," edition 1870, p. 189, in the chapter on "Pitch;" for the two first, see A 484·1 and A 489·2; I have vainly endeavoured to discover the third, but see under A 376·6.) But, from 1846 to 1854, Sir Michael Costa was conductor at the Philharmonic, and the average pitch then used, as determined from observations by Mr. Hipkins, was A 452·5. In 1874, it reached its highest point, A 454·7, since used as Broadwood's highest piano pitch. But the highest English concert pitch which I have recorded is that at the Wagner festival in the Albert-hall, measured by Mr. Hipkins as A 455·1. Pianofortes have even gone higher; thus, the Erard's fork that I measured is A 455·3; one used by Chappell's tuners, A 455·9; and, though Steinway in England uses Broadwood's and Erard's pitch, in New York he has run up to A 457·2.

The London opera fared differently. In 1857, Bettini's fork, sent to the French Society of Pianoforte-makers, is said by de la Fage to have been measured by Lissajous as A 456·1, which is higher than any modern English pitch now known; so that I think there must be some mistake. Two forks, copied from others used by Sir M. Costa when conducting at Covent-garden Opera, show A 453·4 and A 454·7. A little before 1878, the pitch had been reduced to French at both Italian operas, on the urgent solicitations (and rather more) of Mesdames Nilson and A. Patti. But, in 1878, the fork for tuning the organ at Covent-garden gave A 441·2, and Mr. Hipkins found the harmonium of the opera in that year at A 447·5, and, during actual performance of the band, he measured A 449·9. In 1879, the organ was sharpened to A 445·6. I inquired of Mr. Pitman, the organist, why the pitch had been sharpened; he said that it had been settled at the end of the season of 1878, because the oboe, bassoon, and flute could not be got to play properly to a lower pitch. Moreover, he declared that the singers themselves objected to a low pitch, averring that they could not sing in tune to it. That singers accustomed to high pitch should prefer singing in that pitch is probable, provided that the notes they have to produce do not come too near the extremities of their compass. But, if they were obliged to sing music written for the mean pitch in this high pitch, they would soon cry for transposition in the other direction. The fact remains, that here again orchestral pitch has been raised solely by the obstinacy of players of wind instruments, and without the least regard to the powers of the singers, whom they dragged after them. During actual performance at Covent-garden, in 1879, the organist held A on the organ for half an hour for the instruments to tune to. But, though the organ was tuned to A 445·6, the heat of the house raised it, according to Mr. Hipkins's measurement (made by beats), to A 449·7, which was, therefore, the real pitch of the Covent-garden Opera last season. But, according to the *Athenæum* for 8th November, 1879, the pitch is to be again reduced to the French pitch, A 435·4, on the instance of Madame Patti— "whose voice has deepened considerably of recent years at the expense of her upper register"— a reduction comparable to that of the French opera under Madame Branchu's influence. "M. Lassalle, the eminent baritone," continues the *Athenæum*, "is also said to find the difference of pitch between the Paris Grand Opera and Covent-garden very embarrassing." The management has certainly procured a fork from Paris, which I have measured and found to be in correct French pitch. So the singers have again reduced the pitch!

Of her Majesty's Theatre I cannot speak with the same detail. In 1878, the fork for tuning the organ was A 436·1; but it was, probably, at least A 440 during performance. In the winter season of October, 1879, Mr. Hipkins measured the pitch at A 445·5 during performance, and, in January, 1880, he measured the theatre fork itself at A 444·9.

Modern organs, since mean pitch was thrown overboard, have been nowhere. Most organ-builders, during the transition, put the old flat organs into Sir George Smart's pitch, A 433·2; so

that organs which have not had their pitch adjusted for thirty to fifty years seem to have French pitch, as St. Mary's, Shrewsbury, A 433·6, Fulham Parish Church, A 430·4, and, perhaps, Green's restored organ at Trinity College, Dublin, A 436·8. Most modern organ-builders will build to any pitch. The favourite is about B. Schmidt's low pitch A 441·7, but many build to French pitch for churches, and "band pitch," or about A 450, for public halls and performances, and sometimes even for churches, as Bryceson's organ at St. Michael's, Cornhill. Of course, when the church gets warmed up, the pitch rises still more, and the singers are distressed, as the organist of the last-named church complains. In fact, when we put organs into this pitch, we have, unconsciously, reverted to one of the high church pitches, as A 457·6, the great Franciscan organ at Vienna, and A 454·2, the old Brixton fork. But the music which we wish to perform is not adapted for that high pitch. Except in the last few years, it was written for the mean pitch; so that, properly, all music composed before 1820 should, on such organs, be transposed a semitone down, which would be unnecessarily inconvenient to the organist.

It is, therefore, impossible to say that there is any organ pitch or any orchestral pitch in England at the present moment. Many old organs are at mean pitch; several of them were raised about 30 to 40 years ago to French pitch, as it has been subsequently termed. Some recent organs have been originally so tuned. A few of Bernhardt Schmidt's B *flat* foot organs remain, and many new organs are tuned to this favourite pitch of modern organ builders, but not a few organs, especially those used for concert purposes—as at the Crystal Palace, St. James's and Albert-halls, Alexandra Palace and Royal Academy of Music—are at the highest pitch. A 450·6 to A 455·1. Exeter-hall is a little flatter, A 447·3. The Philharmonic concerts remain at the extremely high pitch. In smaller concerts, much depends on the piano used. Broadwood, Erard, Steinway, all use the sharp pitch for concerts, but Broadwood has a second medium A 446·2, for private instrumental performance, and keeps French pitch for pianos to accompany private singers. Brinsmead uses the same three pitches. Other piano makers and tuners also use French pitch, as well as the high pitch, and others a so-called Society of Arts Pitch, which should have been A 444, but rises to A 445·7, 448·4, 449·4, 450·3; that is, gradually becomes the High Pitch. The military bands have quite gone over to high pitch, A 451·9, 452·9. The only standard that I know of which preserves mean pitch is that of the Tonic Sol-fa College, formerly A 427·5, but since reduced to A 422·5 or thereabouts, which is the true mean. All the Tonic Sol-fa teachers, however, do not employ this standard, and some use a much sharper pitch.

Such is the very undignified and unscientific position occupied by our own country with regard to musical pitch—a position into which we have drifted without due consideration, and which is the occasion of much practical inconvenience. It is entirely an orchestral or instrumental pitch, due to the makers, especially, of wind instruments, and maintains its ground on account of the expense of changing the instruments—£1000 is mentioned in the probable cost of the contemplated reduction of pitch at Covent-garden—as if the price of whole orchestras of instruments bore an appreciable ratio to the loss caused by the premature ruin of one great singer's voice!

Art. 28. *The Compromise Pitch.*—The gradual increase of pitch in France—though its highest, A 452 at Lille, was less than our highest, A 455·1 to A 455·9, or Steinway's American A 457·2—alarmed French musicians, and on 17th July, 1858, a Commission was appointed by the then Government, "to investigate the means of establishing, in France, a uniform musical pitch," alleging the increase of pitch to be a great drawback to musical art, from which composers, performers, and instrument-makers alike suffered, and the difference of pitch to be a constant source of embarrassment to concerted music and commercial transactions. The Commission consisted of four officials, two physicists, one orchestral composer, and five operatic composers (one of whom, M. Halévy, drew up the report), but no singer, or musical performer or musical instrument-maker of any kind. A translation of the Report, dated 1st February, 1859 (to which I am much indebted, as the original cannot be purchased), is given in the *Journal of the Society of Arts* for 3rd June, 1859. The Commission did not seem to be aware of the former general acceptance of mean pitch. They all agreed that the pitch must be lowered; one wanted to reduce by one-eighth of a Tone, several inclined to a semitone, which would have brought about mean pitch, but the majority were in favour of a compromise, and advocated the reduction of a quarter of a Tone. The actual pitch desired was A 435, and Messrs. Despretz and Lissajous, the physicist members of the Commission, were entrusted with making it. It seems that they really produced A 435·4, which must be considered a very great success. Then, on 16th February, 1859, a decree was issued for its use after 1st July, 1859, in Paris, and after 1st December, 1859, in the departments, for all places receiving Government aid, and the same decree provided for preserving the original fork and issuing stamped copies. This last arrangement has been dropped. How inefficient it was to secure perfectly accurate copies will be seen in Table I., under A 435·4. Whether the use of this pitch is still imperative I do not know, but there is, at least, one standard of music pitch, preserved in the original fork at the Conservatoire, in a form which bids fair to endure. This is one excellent result. Of course, there was a revolution in the construction of French musical instruments, and, at present, French pitch is the easiest one to find instruments for, except in London.

In Germany this compromise pitch met with great favour, and it was adopted at court theatres and some others, but by no means universally. The only place in Europe which had two distinct sets of instruments—independently of the new French—was, perhaps, Dresden. The lower was in mean pitch A 418·1 to A 424, and the higher, intentionally in Stuttgart pitch A 440, but really rather lower, A 438·9, and this the direction of the theatre thought too near to the French to warrant the expense (about £900) of a new set of orchestral instruments. In 1861 and 1862, the direction had three operas—Mozart's "Magic Flute" and "Idomeneus," and Marschner's

"Templar and Jewess"—performed in mean pitch. In consequence of the success of these performances, and partly owing to the exertions of Herr Näke (who, as a teacher of singing, was very anxious to restore mean pitch, the full historical value of which he duly appreciated), a conference was appointed, and invitations were sent out on 5th August, 1862, to the principal German and other theatres, to witness performances in both pitches, and discuss the result. This conference met in September, 1862, and witnessed the performance of Gluck's "Iphigenia in Aulis" and Mozart's "Idomeneus," both in mean pitch, and of Rossini's "William Tell" and Weber's "Euryanthe" in the usual pitch of the Dresden Theatre, and a series of private morning performances in the rehearsal-room of the theatre, consisting of Weber's overture to "Oberon," Mozart's "O cara imagine," from the "Magic Flute;" the *Scena* of Bois Guilbert, in Marschner's "Templar and Jewess;" the trio of the three ladies, "Oh, stelle! soccorso:" and "Vinto è già il mostro," from Mozart's "Magic Flute;" and "Durch die Wälder," from Weber's "Der Freischütz;" all in both pitches, in immediate succession; and "Che pur aspero," from Mozart's "Seraglio," and the Polacca "Son Vergin Vezzosa," from Bellini's "Puritani," both in the Dresden Theatre pitch only. On 1st October, 1862, several of the gentleman invited met in the theatre, and, after a conference, the following resolution was adopted, with only one dissentient (Herr Näke).

"That a lowering of pitch to the new Paris standard appears equally desirable and satisfactory for singers and for orchestra. That quality of tone would gain, the brilliancy of the band would not be lost, and the power of the singers would not be so severely taxed or strained. That, on the other hand, it was probable that, especially in recent operas and in instrumental music, a further reduction down to Mozart's pitch, as it was called [A 421·6 that is, mean pitch], would injure the brilliancy and effect of the music under the present entirely altered conditions, and, consequently, such a reduction must be rejected as unpractical. That *uniformity*, especially in the orchestral pitch which is to govern the future, must be looked upon as the principal object and chief gain, and consequently, under present circumstances, it was desirable that the Paris orchestral pitch [the compromise pitch, or diapason normal, A 435·4] should be generally adopted in Germany; a course which would be certainly welcome to singers, and be gratefully accepted."

Herr Näke contended that *uniformity* was not the principal point, but suitability and beauty. The principal object to be considered was the singer, and the preservation of his voice. That is, his standard was vocal, not orchestral; which is the reverse of that propounded in the resolution.

The report of this meeting was drawn up by Dr. Julius Pabst, and was signed by Von Koenneritz, general director of the Dresden Theatre; Franz Abt, composer, and Kapellmeister of Hanover; Bernhardt Scholz, Kapellmeister of Hanover; Gerold, director of military music, Hanover; Carl Reiss, Kapellmeister of Cassel; Edward Thiele, Kapellmeister of Dessau; Professor Loewe; Karl Naeke, singing master, of Dresden; Friedrich Kaufmann, acoustician, of Dresden; Lendel, instrument-maker, of Dresden; C. Krebs, Kapellmeister of Dresden (Rietz being too ill to attend); and Franz Schubert and J. Lauterbach, concert masters, of Dresden. Kapellmeister Taubert, of Berlin, was not present at the conference, but expressed his adhesion to the resolution, as did Kapellmeister Ernst Lampert, of Gotha.

The above account is taken from the official lithographed report furnished to musicians present, a copy of which I obtained from the direction of the Dresden Theatre, through the kindness of the librarian, Herr Moritz Fürstenau, and I wish to draw attention to the great importance of the opinion of practical musicians who had had such a remarkable opportunity of forming a judgment. To this list I should like to add the name of Mr. Turle, the venerable organist of Westminster Abbey, whose organ, built by Schreider and Jordans, originally, perhaps, an A foot organ (see A 474·1), had been reduced to mean pitch long before Mr. Turle's time, but, at the coronation of George IV., 19th July, 1821, was "slightly raised by Greatorex." Mr. Turle's predecessor; that is, was put into Sir George Smart's pitch, which was, as we have seen, identical with the French pitch of to-day. At this pitch the organ remained till 1848, when it was renovated and retuned to his own pitch, A 441·7, by Hill. After this long experience of French pitch, and high (not highest) pitch, Mr. Turle adds, "The French pitch is, in my humble opinion, a most sensible one."

It is quite hopeless to suppose that the mean pitch will be again adopted, as, although suitable to classical music, it is not suitable to modern music. It is impossible to transpose a semitone lower in an orchestra, for the violins and wind instruments would be quickly out of their depth, and our stringed instrument players are not likely to slacken their strings a semitone, as the organist of Seville Cathedral assures me that they do there, when playing with the organ. Hence it seems necessary to choose a pitch which, like the French, stands exactly halfway between the two; so that while it exactly suits neither, it will do the least violence to either. It is a compromise, and, on the whole, it is always unfortunate to have to resort to compromises. But a compromise is often all that is possible. In the present case, musical compositions written for mean pitch and high pitch must both remain to be used. Instruments for playing in the compromise pitch exist. It was, also, a pitch which was for many years prevalent in England, and there must be plenty of instruments, of 30 or 40 years old suitable to it. It was a pitch used by one of our favourite conductors, Sir George Smart, and has many opinions in its favour. Not that it has remained in Germany, where it seemed to meet with so favourable a reception. None of the Governments of that country really enforced it. When the Society of Arts endeavoured to collect information through the Foreign-office, they found it in Munich officially, in Stuttgart unofficially, and (although the older high pitch was much used) in the Court Theatres and Imperial Band, but not in other places, in Vienna (and, in 1878, I found A 446·8 even at Vienna, not far from the old sharp pitch A 456·1); in the Duchy of Baden (where even the regimental bands used it); in a few theatres at Berlin (where most bands used a higher pitch), and in the Concert Society of Cologne. In other places, and even in the towns

and countries above mentioned, except in the places specified, the French A 435·4 was not in general use. Beyond France and Germany it seems to have found no favour till it was the other day (18th March, 1879) adopted officially in Madrid, and has been chosen for the coming opera season in Covent-garden.

Immediately after the French Commission had reported, the Society of Arts appointed an influential commitee of 50 members, on 3rd June, 1859, which published a report drawn up by Mr. Hullah. The committee do not seem to have closely investigated the History of Musical Pitch, and its leanings toward C 512 and C 528—which it finally recommended—seem to have arisen rather from arithmetical than from musical feeling. Indeed, in the subsequent debate, Sir John Herschel especially took the arithmetical view of C 512. It is enough to say that there were then no means of tuning C 512 and C 528 exactly, and that even now it is difficult, if not impossible, to meet with forks giving these precise pitches. But, if perfect exactness be not attained, the whole arithmetical charm is broken. Curiously enough, C 512 was approximately attained by Renatus Harris by putting the one-foot pipe with a narrow scale (one-twelfth) on B *natural*, and using meantone temperament; and C 528 was very closely reached by Bernhardt Schmidt by placing the same one-foot pipe with a wide scale (one-tenth) on B *flat*, and also employing the meantone temperament. Harris and Schmidt, and, quite recently, Willis, reached these results much more closely than Mr. Hullah (whose C 512 fork turned out to be C 524·8), or than Mr. Griesbach for the Society of Arts (whose C 528 fork is C 534·46). Such forks can be produced now with much greater exactness, but absolute exactness is Utopian. Every alteration of temperature by 10° F. would destroy it sensibly, even if attained at one mean temperature. Then, again, the arithmetical value of C 528, owing to its representation of the natural intervals of the scale by whole numbers, depends solely upon using Ptolemaic, or Just Intonation, for the major scale of C and no other. Mr. Hullah, who advances this argument in his Report of the Committee to the Society of Arts, is one of the stoutest defenders of equal temperament, to which it has no sort of application. Indeed, by neglecting temperament in the whole of this report, some curious errors have been unintentionally committed. Thus, the Committee, intending to adopt the German A 440, made it identical with C 528; whereas, on equal temperament, A 440 requires EC 523·25; so that, if their A was right, their C was much too sharp; whereas C 528 required EA 444. This involuntary sharpening was enhanced by Mr. Griesbach's errors of A 445·7 and C 534·46; so that the Society of Arts pitch, which was supposed to be but little sharper than the French, actually became one of our very sharp pitches. There is, however, no room for two compromises. The Dresden Theatre, having about A 440, did not require A 435. It would have been impossible to keep a set of instruments in the intended Society of Arts pitch distinct from French instruments. Perhaps, for this reason, the attempt has never been made. The Society of Arts pitch has been absorbed into our high pitch, and the only recognised compromise is the French Diapason Normal.

Art. 29. *Conclusion.*—I have thus endeavoured to sketch the History of Musical Pitch from 1361 to 1880. I distinguish, first, the Early Church Pitch, which was, at the same time, excessively low and excessively high, for the same reason, the exigences of ecclesiastical music, as interpreted by the human voice and the foot-rule of the country. Secondly, the Early Chamber Pitch, where the exigences of secular music made themselves felt, and the pitch was taken at intervals of the scale above and below church pitch, to allow of the instruments and organ playing together. Thirdly, the Influence of Chamber upon Church Pitch made itself felt by the construction of organs in chamber pitch. Fourthly, the construction of organs in chamber pitch led to the proposal and very general adoption of Mean Pitch for both church and chamber. To Herr Näke is due the merit of pointing out the great importance of this pitch, as having been used by the classical writers of music; and to his labours and collections (through the kindness of his widow) I am under great obligations. But he had not gone back to a period earlier than 1714, and hence had been unable to see how Mean Pitch arose; so that I consider the establishment of this pitch, and its relation to earlier usage, one of the chief results of my own investigations. Fifthly, the predominance of instruments over voices, brought about the gradual abandonment of mean pitch, and the introduction of Orchestral Pitch, which, since 1816, has led to all the modern confusion of pitch; due, not to any preconcerted arrangement, but often to accidental circumstances, such as the presentation of new instruments to a regiment, the acquisition of a new flute, the cutting down of a horn, the persistence of oboes and bassoons in playing sharp, and the expense of acquiring flatter instruments, but in all cases to the elevation of instruments above voices, that is, to orchestral motives. These alterations I trace in England to the present day, and abroad till 1859, when we arrived, sixthly, at the Compromise Pitch of the French Commission, which proposed, and in France actually carried out, a pitch which lay halfway between the Classical Mean Pitch and the modern high pitch; and I trace, in some degree, the consequences of this introduction, and endeavour to show, by the results of the Dresden Conference, that it is the only available pitch in which both modern and classical music can be executed.

But this history consists merely of my own inferences on the large series of facts which I have partly collected from others, and partly for the first time myself discovered and published. Having shown the bases on which all these pitches have been calculated, I do not think that subsequent investigation will discover any practical error—say, any error amounting to one vibration in two seconds—in the measurements themselves. The only doubt attaches to the scale, force of wind, voicing, temperature, and crowding of certain organ-pipes, as already pointed out. These facts, then, must, I believe, form the basis of all subsequent examinations on the subject. I wish they were more complete, but the difficulty of getting information is, sometimes, exceedingly great, and the time spent over obtaining a single pitch has often been so long that I

should despair of living for years enough to render my investigations really complete. A personal examination of all existing old organs throughout Europe, with visits to all great organ-builders for isolated pipes, to makers of musical instruments, to physical cabinets, and amateurs who have inherited forks, would be necessary to complete the history. I could only accomplish a small portion of this work, but the collections I have made, and present in the following tables, will enable any successors to insert their own observations by the aid of the forks which I have made purchasable, and, after my death, of my own forks, which I shall take care to make available for their use at some public institution, warned by the great loss the world has sustained by the disappearance of Scheibler's own fifty-two fork tonometer.

The two following Tables, containing the record of these facts and their authentication, really constitute my paper, and I hope they will be accepted as a sufficient reply to the objection which was very reasonably urged against the extremely insufficient account of early musical pitch in my former essay.

It is rather important that a modern should be able to realise some of the principal effects of these great changes of pitch. As regards the very gradual transition from the lowest mean to the highest orchestral pitch, which is nearly a Tone, working by very small degrees, the only feasible plan seems to be to use the human voice, pitched to different standards by properly prepared tuning-forks, as those which I used for determining the compass of the voice. But the general effect of the main difference between old and new pitch may be well illustrated by a piano tuned to Broadwood's medium pitch and in equal temperament, which is indispensable for accurate transposition, such as I have here. This is almost precisely an equal semitone sharper than Handel's pitch. Mr. Hipkins will now kindly play a very well-known air by Handel, "See the Conquering Hero comes," originally written in G, in the pitch at which Handel heard it; that is, by transposing it to G *flat* on this instrument. This is, therefore, the classical pitch. Now, descending a tone—that is, transposing to E natural—we have the same air in Schlick's low pitch, which was also the old French; that is, the lowest church pitch. Ascending by a fourth—that is, by five equal semitones, and hence playing in A natural—we have the same air in Schlick's high pitch, and as it would have sounded on the Halberstadt organ, or in Mersenne's *ton de chapelle*; while, by going another Tone higher, or playing in B, we reach Mersenne's *ton de chambre* and Prætorius's high pitch, which may, possibly, have been the pitch for which Orlando Gibbons wrote (see A 567·3). Reverting, for a few bars, to Handel's own pitch, or G *flat*, on the instrument, just to refresh our ears, we sink a semitone, to play in F at the pitch of the organ at Trinity College, Cambridge, when Dr. Robert Smith was master. Then, ascending a Tone, or playing in G, we have very nearly the effect of the same organ as Bernhard Schmidt built it, in his low pitch, before the pipes were shifted; and this is the natural pitch of the present piano. One semitone higher, or playing in A flat, gives us Tomkins's and Bernhardt Schmidt's high church pitch, as in the oldest form of the Durham organ. Now, you have listened to these seven varieties, feeling them to be, as they were played, mere transpositions. But you must recollect that they would have been all written by the same notes, and played with the same finger-keys on the organs of these different times. They are not an air transposed. They are the different sounds attributed at different times to the same symbols, just as the different nations of Europe now utter different sounds to represent the same Arabic numerals.

In the two following Tables, you will find many pitches which differ by only one or two tenths of a vibration, and others by only one or two vibrations in a second. Such pitches are practically identical. It is scarcely possible to keep apart pitches which differ even by a comma, or V 1 in V 80. But twice that amount is very perceptible indeed. And, when examining a long series, if two pitches which differed so slightly were confounded, considerable mistakes of grouping might have been committed. I have, therefore, given every pitch as accurately as I found it described, or could determine it myself, up to V 0·1 and S 0·01, both of which limits are beyond the power of the human ear to appreciate when two notes are struck in melodic succession, although they can be readily rendered perceptible mechanically. And I have throughout purposely relied only on mechanical evaluation, to the exclusion of mere estimation of ear, which I could not have trusted at all in my own case, and which I have not unfrequently, but quite unexpectedly, found decidedly defective, even in persons of undeniable fineness of perception; more especially in the estimation of the extent of musical intervals and the recollection of musical pitch. And I trust that the great length of my Tables will be excused on the ground of the musical importance of the facts which I have been enabled for the first time to bring together and appreciate.

TABLE I.

Historical Musical Pitches in Numerical Order, proceeding from Lowest to Highest.

Arrangement.

Tuning A.—The pitches are arranged according to the value of 2 A; where possible, this 2 A has been measured direct; where some other note only could be measured, the 2 A has been calculated according to the (M) meantone, (E) equal, or (J) just intonations. All three are always calculated, but that one is placed first which is considered to have been most probably in use at the time, and the rest are added in square brackets. The corresponding 1 C, when not measured direct, is also given in all three intonations. In every case, the note measured direct is annexed, with its name alone, as A, C, F, &c., without any qualification but the mark of its Octave. MA, MC; EA, EC; JA, JC; therefore, without the mark of the Octave, are always calculated tones.

Pitch.—After the letters giving the names of the notes follow the numbers of double vibrations in a second, to the nearest tenth, or one place of decimals (the number of tenths, therefore, follows the inverted period, and the number of double vibrations precedes it). For continental measures, all these numbers must be doubled to give single vibrations; thus, A 435 is called *La* 870 v.s. in Paris. When several pitches are identical, they are placed in order of date, and marked (1), (2), &c. It must be particularly observed that all pitches, especially of organs, have been reduced, as far as lay in my power, to 59° F. = 15° C. = 12° R. Unfortunately, other observers seldom indicate the temperature, but pitches of organs are generally supposed to be taken at spring and autumn mean temperatures.

Intervals between Pitches.—After the pitches follow S (meaning equal semitones) and a number, showing by how many equal semitones (preceding the inverted period) and hundredths of a semitone (following the inverted period) the A at the commencement is sharper than the zero or lowest A 370. Thus, A 444·7, S 3·18, shows that the pitch for which A makes 444 double vibrations and seven-tenths of a double vibration in a second is three equal semitones and 18-hundredths of an equal semitone sharper than the zero pitch A 370. By subtracting the S of one pitch from that of another, we find how much sharper one pitch is than the other. Thus, A 435·4, S 2·82, is (S 3·18 less S 2·82, or S 0·36, that is), 36-hundredths of an equal semitone, flatter than A 444·7, S 3·18.

The rule for finding S from the number of vibrations is given in footnote 4 to Art. 5, p. 295. As the tenth of a vibration is often less than the hundredth of a semitone, several pitches will often have the same S.

Observers.

The name in a parenthesis immediately following S is that of the observer who measured the pitch of the note in question. When only one pitch is due to a given observer, he is sufficiently described in the note on that pitch.

Cagnard de la Tour (Charles), baron, French Physicist, b. 31st March, 1777, d. 5th July, 1859, inventor of the Siren, employed his instrument to measure several pitches, here given on the authority of others, who are always named. The siren was first described by him in the "Annales de Chimie," vol. xii., 1819, pp 167-171, and was much improved by M. Aristide Cavaillé-Coll.

Cavaillé-Coll (Aristide), born at Montpelier, Department of Hérault, 4th Feb., 1811, established at Paris 1833, where he still resides, and has been long celebrated for the extreme perfection of his organ work. He determines pitch by means of copies of Scheibler's forks. I have been greatly indebted to him for assistance in every way. His little work, "De la Détermination du Ton Normal," 1859, and his "Etudes Exp rimentales sur les Tuyaux d'Orgues," Comptes Rendus, 1860, p. 176, have been very useful to me.

de la Fage (Adrien), a musical writer and critic, author of "De l'Unité Tonique," 1859, intended to influence the decision of the French Commission but published too late, with additional notes, and an excellent table of pitches, which has been of great service to me.

Delezenne, died at Lille, August 20th, 1866, meteorologist and acoustician, author of numerous papers on the acoustics of music in the "Mémoires de la Société des Sciences à Lille," 1826 to 1857, of which the most important in relation to pitch is his memoir "Sur le Ton des Orchestres et des Orgues," second series, 1854, p. 1, to which I have been greatly indebted. M. Delezenne worked with a peculiar bowed monochord tuned to Marloye's V 128, and obtained pitches of organs by tuning forks with sliders, measuring the forks afterwards by this monochord (see Art. 13, p. 298). I have great confidence in his results.

De Prony (G. C. F. M. Riche), baron, French engineer and mathematician, b. 1755, d. 1839, proposer of the system of reckoning intervals by equal semitones and fractions (which is identical with my S, but I have not been able to see his work on acoustic logarithms). He gives two pitches in his "Mécanique Analytique," Part II., 1815, p. 495, obtained by means of Euler's formula.

Drouet, —, Kapellmeister to the Grand Duke of Saxe Coburg-Gotha, cited by the French Commission, is stated to have sent them three tuning-forks, but the measurements were probably taken in Paris. I have not seen any memoirs by him. His pitches are cited from the French Commission.

Ellis, the author of this paper. Where my name is affixed, it means that I am responsible for the measurement, unless otherwise stated.

Euler (Leonhardt), the celebrated Swiss mathematician and physicist, b. 1707, d. 1783, gives two pitches, incidentally discussed below, A 418 and A 392·2; but I attach no great value to them.

Fischer (Ernst Gottfried), physicist, measured four pitches with great care by a weighted monochord. Berlin; Abhandl. 1822-23, pp. 187-216.

French Commission.—This is the Commission of 1858-9, which settled the Diapason Normal. The anonymous measurements given at the end of their report are probably due to MM. Despretz and Lissajous, and were possibly made with the siren, assisted by M. Cavaillé-Coll's bellows of precision I was unable to find any of these forks in Paris (except those sent by Messrs. Broadwood), so that they had been, probably, all returned, and it was impossible to verify the pitch. But, in the case of the three forks of Broadwood, some mistakes were certainly committed.

Hill (Thomas), of the firm of Messrs. Hill and Sons, the eminent London organ-builders. Mr. T. Hill has been of great assistance to me in many ways, by allowing me to measure on his bellows old organ-pipes which he had preserved from organs he had altered, by informing me of the sharpness or flatness of several organs he has restored of which no pipes existed, and by kindly making and presenting to me ten pipes of which the measurements had been furnished by old writers. Great part of my success has been due to his valuable assistance.

Hipkins (A. J.), of Messrs. J. Broadwood and Sons, a musician, and a writer on musical instruments, who introduced equal temperament into Broadwood's in 1844-6, and who has constantly been engaged in noting, and recording on forks, important varieties of English pitch. To him I owe the loan of many important forks belonging to himself and others, which I have measured myself, and also several pitches which he took by beats with other forks that I had measured. In every possible way throughout my work. Mr. Hipkins has lent his valuable assistance to me with the utmost kindness and readiness.

Lissajous (Jules Antoine), born 1822, the eminent French physicist, inventor of the optical method of examining musical intervals, a member of the French Commission, and especially commissioned, with M. Despretz, to superintend the construction of the Diapason Normal. The pitches attributed to him are, if possible, cited from his original memoirs, or from the Report of the French Commission, but many of them are given solely on the authority of de la Fage.

McLeod (Herbert), Professor of Physics at Cooper's-hill College, joint inventor (with Lieut. Clarke) of the optical process for measuring tuning-forks, as described in Art. 15, p 298 I am greatly indebted to him for his verification of Scheibler's tonometer by re-measuring sundry forks for me.

Marpurg (F. W.), German musician, b. 1718, d. 1795, determined some pitches by the weighted monochord, one of which I have found in his works, and the other I have to give on the authority of the French Commission.

Naeke (Carl), Professor of Singing at Dresden, author of a pamphlet, "Ueber Orchesterstimmung," privately printed for the Dresden Conference in 1862, and presented to me by his widow, who also kindly sent me several of the valuable forks which he had collected; so that I was able to verify his measurements, which I found extremely accurate. I am greatly indebted to Herr Näke's work.

Sauveur (Joseph), b. 1653, d. 1716, an eminent French acoustician, who has left us some doubtful pitches, discussed under A 406·6.

Scheibler (Johann Heinrich), born 11th Nov., 1777, died 20th Nov., 1837, to whom we owe the conception and execution of the Tuning-fork Tonometer described in Art. 18, p. 299, left a record in his "Tonmesser," 1834, of several valuable pitches measured by himself, all of which have been used, and are, probably, perfectly accurate.

Schmahl (H.), organist of St. Jacobi Kirche, Hamburg, who has copies of Scheibler's forks for tuning in equal temperament to A 440 and A 445, together with his A 420 and A 430 for determining pitch. By the help of these and other forks, he determined numerous pitches for me. To Herr Schmahl I am also indebted for many references to older German writers on music, especially Praetorius, with which he is well acquainted. His assistance has been very valuable to me.

Smith (Robert), D.D., mathematician, born 1689, elected master of Trinity College, Cambridge, 1742, died 1768, author of a work on "Harmonics," 1749 (second edition, 1759; and postscript, 1762), discovered the law of beats of disturbed consonances, and used a weighted monochord to measure the pitch of his organ. (See A 441·7 and A 395·2.)

Wieprecht, —, cited by the French Commission, must, I suppose, be the director of military music in Prussia of that name, who, as the Commission states, sent them a masterly letter on the subject. I have been unable to find any memoirs by him.

Wölfel, —, mentioned by M. Cavaillé-Coll as having constructed a tuning-fork tonometer on the model of Scheibler's, without any other assistance but Scheibler's pamphlet, and quite as accurate as Scheibler's. It took him two years to construct it.

Date.

This gives the date of the fork, or of the instrument measured, as nearly as can be ascertained, when it is probable that the pitch has not been changed. Organs have been frequently altered in pitch. Old forks can often only be conjecturally assigned to their date. The date of altered organs is either that of their last change, or of the time of measurement. The letters *a*, *c*, *p* after a date mean—*ante*, before; *circa*, about; *post*, after. Thus, 1800*a* means before 1800, how much before unknown; 1800*c* means about 1800, before or after; 1800*p* means after 1800, how much after unknown. But *a* sometimes means before and up to, and *p* sometimes means from and after.

Place.

The town, and, if possible, the peculiar institution (opera, conservatoire, &c.), where the pitch was used or instrument measured, are next given.

Particulars.

Then follows as good an account as can be succinctly given of the means of determining or inferring the pitch employed, so that the reader may judge of its trustworthiness.

Historical Pitches.

1. *Church Pitch, Lowest.*

A 370, MC 442·6 [JC 443·9, EC 440·0], S 0·00. (Ellis.) Ideal pitch, lower than any found in practice; used, therefore, as a zero point from which to measure the intervals of all other pitches in hundredths of an equal semitone Considered as equally tempered, it gives EC 440, which shows that it is almost precisely an equally tempered minor third below A 440·2 in that temperament; that is, below Scheibler's pitch adopted by the Stuttgart Conference.

MA 373·1 [EA 375·4, JA 372], C 446·4, S 0·15. (Delezenne.) Mean of 11 attempts to measure the pitch of an open wooden pipe 1·3 metres long; height of mouth, 16 mm.; section, 86 mm. by 72 mm.; constructed by Delezenne to determine the pitch of a pipe of 4 pieds de roi. The mean of 11 measures gave V 111·594 as the pitch of the pipe, which, taken as 4 C, gives 1 C 446·376. Delezenne does not say what was the temperature, or on which side the mouth was placed. Compare A 373·7, 374·2, 376·6.

MA 373·7 [JA 372·5, EA 375·9], C 447, S 0·17; pressure, 3¼ in. (Ellis.) 1648, Paris. Mersenne "Harmonicorum," lib. I., prop. xxi.) gives, as the dimensions of the "lowest pipe of an organ which he had at hand," 11¼ Fr. inches (= 318·07 mm.) in length, and 1½ Fr. in. (= 40·61 mm.) in diameter, and stopped. If Mersenne, as is probable, took only the outside measures, we must

allow 1 mm. for the thickness of the cap, and 2 mm. for the double thickness of the tube. This would make the real dimensions 317·07 mm. in length and 38·61 mm. for the diameter. I had an open pipe constructed, 318 mm. long, and 38 mm. in diam., which would, of course, give the octave above a stopped pipe of the same dimensions, and it spoke V 446·26, 447·1, 448·1 under pressures of 2½, 3½, and 4 inches respectively. Multiplying these numbers by 1144 (= 3 × 318 + 5 × 38) and dividing by 1157·26 (= 3 × 318·07 + 5 × 40·61), or 1144·26 (= 3 × 317·07 + 5 × 38·61 , we can find what the pipes of the other dimensions would speak. (See rule, Art. 8, p. 294, note 5.) We get, then, for the outside measures, V 441·1, 442, 443; and, for the inside measures, V 446·2, 447, 448 at the three pressures respectively. Considering that Mersenne, who was very inaccurate, measured outside, so that the reduced inside measures are more correct, and that the pressure was more probably 3½ inches, I assume V 447 as most likely to be the pitch of the pipe. This so nearly agrees with Bédos's A 376·6 giving C 450·5, that Mersenne's stopped pipe, must have been intended to be in unison with an open organ-pipe of two French feet. But what note did it represent? It might be 4 F, 4 G, 4 B, or 2 C, as the two-foot pipe was used in all these senses in France Hero I have assumed 1 C 447, that is, the four-foot pipe, as V 111·75, which agrees very closely with my measures of Bédos (see A 376·6) and with Delezenne's measurements (see MA 373·1). In the other cases (see A 402·9,503·7, 563·1), I assume Bédos's measure as being probably more accurate. To show Mersenne's inaccuracy, I may mention that, in the very place where he gives the dimensions of this pipe, he says that it is of the same pitch as a brass wire ½ French line (= ·45 mm.) in diam., 9 Fr. inches (= 243·62 mm.) in length, weighing very nearly *(proximè)* 8 French grains, and stretched by a weight of 6½ Fr. pounds, each containing 9,216 Fr. grains. Then, by the rule Art. 13, p. 298, we find V 277·2 in place of V 223·5. Again, from this string, Mersenne's own calculations should give V 200; but he immediately writes 150 in place of it, and continues to use the latter number. Again, in his "Harmonie Universelle" (livre iii., "Des Mouvements et du Son des Chordes," p. 169), he gives V 84 to the 4 Fr. feet pipe; but, in another place *(ibid.*, livre iii., "Des Instruments à Chordes," p. 143), he gives V 96, which he employs in his general table, p. 142 (where there are many misprints), and then, in a corollary to the first proposition, he notices the discrepancy (which amounts to more than a Tone), and says it is of no consequence, for people should repeat his experiment, and take what number suits them. The numbers in his table *(ibid.)* should be increased by at least 17 per cent.

MA **374·2** [EA 376·3, JA 373·0] C 447·5, measured 4 C 112·7, S 0·19. (Delezenne.) 1700*a*, Lille. Dilapidated small organ of L'Hospice Comtesse, the torn bellows modern, the date a conjecture by M. Mazingue (see A 384·3). There is no front, no date, no signature. The C of the principal is a square-stopped pipe, 610 mm. long (deducting thickness of cover), section 75 mm. by 58 mm It is made of oak, and speaks badly. Beats slightly with the experimental pipe described in A 373·1. Temperature not stated.

MA **375·2** [JA 373·9, EA 377·3], C 448·8, S 0·24. (Näke.) 1714, Germany, Saxony. Chamber Pitch, according to Näke, reckoned as a whole meantone flatter than the Freiberg Cathedral organ. I think this conjecture of Näke's to be probably erroneous (see A 415·5 and 419·5, and p. 302, col. 2, about the middle).

MA **376·6** [JA 375·5, EA 378·8], C 450·5, pressure 3½ in., S 0·31. (Ellis. 1766, Paris. Dom Bédos ("L'Art du Facteur d'Orgues," p. 77), gives a table, from which it may be calculated that his 1 C of the *prestant*, or tuning stop, was 324·84 mm. long, and 28·08 mm. in diameter (the measurement on the plates is something less, owing to the shrinking of the paper, which he estimates at 1 in 72). I had a pipe constructed 326 mm. long and 27 mm. wide, which spoke V 450·1, 451·3, 452·5, under pressures of 2½, 3½, and 4 inches respectively. Multiplying these numbers by 1113 (= 3 × 326 + 5 × 27) and dividing by 1114·92 (= 3 × 324·84 + 5 × 28·08), according to Art. 8, p. 296, we obtain for Dom Bédos's pipe V 449·2, 450·5, 451·7, under these three pressures respectively, and these taken as C give MA 375·6, 376·6, 377·6 respectively, of which I select the second as most probable, and have calculated the above numbers from it. Bédos particularly rejected equal temperament as "dure et moins harmonieuse que l'ancienne" (*ibid.*, p. 429). This would give for the 4-foot pipe V 112·6. Compare Delezenne's V 111·6, under A 373·1. It does not follow that this was really Bédos's pitch, for he directs it to be brought to the church pitch, which he says was constant in France, but it could not well have differed more than a comma at this pitch V 1·4 for the 4 C), compare A 373·1, 373·7, 374·2. This is S 2·51, or only a quarter of tone less than a minor Third, below the present French normal pitch. The Rev. Sir F. A. Gore Ouseley tells me (letter, 16 May, 1878) that "in France, when Dom Bédos wrote, the "Ton de Chapelle" was about a minor Third *below* the present French normal pitch," and that "most of the old *untouched* organs in the French Cathedrals are of this low pitch." Mr. Hopkins ("Organ," ed. 1870, p. 191) says that "of the three fine organs built by [A.] Silbermann [at Strasburg], those in the cathedral, finished 1716, and that in the Protestant church, proved on trial, in 1853, to be *a whole tone below* the pitch of" that fork he had with him, and which I have measured as C 518, that is Sir G Smart's pitch (A 433·2), or, as we should now say, French pitch. This indication, taken strictly, would give A 387·5, and, perhaps, as Strasburg was in Aug. 1716 a French city, the old French pitch was used, either the present (Bédos's) A 376·6, or the higher Versailles A 395·8, either of which would sound a Tone flat, and as M. Stockhausen, director of the Conservatoire at Strasburg, 1880, says the organ is ½ Tone below the Diapason normal, it is probably the latter. Delezenne says ("Lille Mem.," 1854, p. 12) that at Gonèse, near Paris, the longest show-pipe was 2·80 mètres or eight French feet long, which would make it of this pitch. It will be observed that this pitch is almost exactly a whole tone below Handel's A 422·5. Sir F. O., in the letter already quoted, says, "I have seen a fork of the period [O. Gibbons's], said to have belonged to Adrian Batten [organist of St. Paul's in 1624, and a composer], which was more than a whole tone below Handel's fork. It was in the possession of a music-seller of Newcastle in 1839 or 1840." This is the only indication I have of so low a pitch in England.

MA **377·0** [JA the same, EA 380], MC 451·0 [JC 452·5, EC 451·9], 2 F 301 6, S 0·33, pressure 3½ inches. (Ellis.) 1511, Germany, Heidelberg. Arnold Schlick (p. 304, n. 8) recommends that the lowest note of a small organ should be 8 F, and that the pipe should be 16 times the length of a given stroke, which his editor measured as 4½ Rhenish inches. This makes the length of 8 F pipe to be 6½ Rhenish feet = 2040 mm. He says nothing about the diameter, and I have supposed it may be one-sixteenth, one-thirteenth, or one-twelfth the length. Then a pipe of a quarter the length and diameter would be 510 mm. long, and 32, 39·23, or 42·5 mm. in diameter respectively. I had a pipe constructed, 510 mm. long and 42·2 mm. in diameter, which spoke V 291·8, 292·8, and 293·8 under pressures 2½, 3½, and 4 inches respectively. Now three times the length, added to five times the diameter of this pipe, and of the three other conjectural pipes, are 1741, 1690, 1726·2, and 1742·5 respectively. Hence, by rule, p. 296, dividing the V at the different pressures by the three last numbers respectively, and multiplying by the first, we obtain the following V for the three kinds of pipe: at 2½ inches, 300·6, 294·3, and 291·6; at 3½ inches, 301·6, 295·3, and 292·6; and 4 inches, 302·7, 296·3, and 293·6 respectively. These, taken as F, give respectively for A considered as a just major Third higher, for the three kinds of pipe: at 2½ inches, A 375·8, 367·9, and 364·5; at 3½ inches, A 377·0, 369·1, and 365·8; and at 4 inches, A 378·3, 370·4, and 367·0. These numbers show about the limits of uncertainty. But as I consider it probable, from an examination of Bédos's proportions, that this 8 F had a diameter about one-sixteenth of its length, I have selected A 377 as the most probable pitch, and calculated the above accordingly, choosing the meantone temperament, because it cannot have differed materially from that which Schlick himself recommends. Schlick, however, also allowed this pipe to stand for 2 C, which will therefore be C 301·6 on the same supposition, (see MA 504·2).

2. *Church Pitch, Low.*

A **384·3**, MC 459·7 [EC 457·0, JC 461·1], S 0·66. (Delezenne.) 1700*c*. Old Fork found before 1854 in an old iron shop at Lille by M. Mazingue, composer and organ-builder. It sounded so badly that it could only be heard for a moment when placed close to the ear. The stem is large and without a button. Delezenne says that, as a major Second above V 384·3 is V 432·3, "of the violins of Stradivarius, we may conjecture that it was a century and a half old. It is also perhaps the fork used to tune St. Sauveur" (see A 384·6). He does not give his authority for the A 432·3 of Stradivarius. It would seem as if he assumed C 256 as the pitch of the resonance of a Stradivarius violin (on which see p. 309, end of Art. 26), and then taking 4 C 128 to be in consequence the lowest note of the viôla, reckoned 3 perfect Fifths up; giving 2 A 432, which see. It is difficult to see how the fact of a fork being a whole Tone flatter than the supposed pitch of Stradivarius should lead us to assign it to his date.

A **384·6**, EC 457·2 [MC 460·0, JC 461·5], S 0·69. (Delezenne.) 1851, Lille. Organ of St. Sauveur, rebuilt at this date, but pitch probably nearly preserved. It belongs to the same class as A 384·3. (See A 432·2.) Equal temperament was probably adopted in 1851.

A **392·2**, MC 466·14 [EC 469·1, JC 470·6], S 1·00. (Euler. "Tentamen novæ Theor. Mus.," cap. 1, §§ 8, 9, and 10, pp. 6 and 7, giving the theory of determining the rate of vibration of a string.) 1739, St Petersburg, Clavichords (according to Marpurg.) Euler gives as an example, length of string 18·667 English inches, weight of string 6·2 grains, stretching weight 46082 grains, whence (by the formula on p. 298) V 196·1, and observes "huic autem sono congruere deprehendi clavem signatam a." He does not say whether this is any particular pitch, or whether it is organ pitch or concert pitch, or Russian or German pitch. Hence it is quite indeterminate.

(1) MA **395·2** [JA 398·9, EA 397·5], MC 472·7 [JC 469·8, EC 470·8] D 528·5, S 1·14. (Dr. R. Smith, Cambridge.) 1759. Trinity College Organ built by Bernhardt Schmidt 1708, after it had been new voiced, and by altering the disposition of the keys depressed a tone lower and thereby reduced to the Roman Pitch, "as I (Dr. R. Smith) judged by its agreement with the pitch pipes made about 1720," (R. Smith, "Harmonics," second edition, 1759, p. 148). For the calculation of the D see MA 441·7. It was measured by means of a weighted wire brought into unison with a lower Octave. Mr. C. A. Bishop informs me that he has "cut down a Father Smith chamber organ to Smart's pitch," that is, to A 433·2. It is possible therefore that B. Schmidt made chamber organs in this low pitch himself, which would be a minor Third flatter than his sharpest pitch, A 474·1. This organ to which Bishop alludes may, however, have been only in Handel's pitch, A 422·5, or may have been lowered long after B. Schmidt's time.

(2) MA **395·2**. (Dr. R. Smith.) Rome, 1720, from pitch pipes compared with organ of Trinity College, Cambridge, in 1759, see A 403·9 and preceding entry.

A **395·8**, MC 478·5 [JC 475·0, EC 470·7], S 1·17. (McLeod and Ellis.) 1789, France, Versailles Organ. Copy (compared with the original, which is in good condition) of a fork (No. 410 of catalogue) in the Musée du Conservatoire at Paris, which belonged to the Abbé M. C. Roze (1745-1819) who was librarian of the Conservatoire during the twelve last years of his life. It gives the A of the chapel of the palace of Versailles in 1789. M. Cavaillé-Coll, who compared the copy with the original, considers it to be perfectly authentic, because about ten years previously, when repairing this organ, he had noticed that its pitch was about a Tone (actually 1·65 eq. sem.) lower than the ordinary French pitch. The temperature at which the pitch was taken is not known, probably a mean temperature would have been chosen. The original fork is four inches from bend to point inside, and the prongs are three-eighths of an inch apart at the end of the bend, and three-sixteenths of an inch at the end of the prongs, stem flat at end; rusty in some places, but not very much. This organ was built by Charles Dallery (b. 1735) and François Clicquot (b. 1720, d. 1791).

MA **396·4** [JA 395·1, EA 398·7], C 474·1, pressure 3¼ inches, S 1·19. (Ellis.) 1615, Palatinate of the Rhein. Salomon de Caus ("Les Raisons des Forces Mouvantes," Franckfurt A.M. 1615, Liv. 3me., traitant de la fabrique des orgues) fixes the F pipe as 3 feet and the C pipe as 2 feet Rhenish. I take, then, the 1 C pipe as one Rhenish foot (= 313·85 mm.) in length, and assume the diameter to be one-twelfth the length (= 26·15 mm.) as in B. Schmidt's B *flat* (see (1) A 441·7.) I had a pipe constructed 315 mm. long and 25·5 mm. in diameter, which spoke V 472·85 and 474·04 under pressures of 3¼ and 4 inches respectively. Correcting by the rule p. 296, by multiplying by 1072·5 (= 3 × 315 + 5 × 25·5) and dividing by 1072·3 (= 3 × 313·85 + 5 × 26·15) we obtain C 472·9 and 474·1 respectively, whence MA 395·4 and 396·4 respectively; and selecting the last pressure as most probable, we obtain the above numbers.

A **398·7**, EC 474 (MC 476·9, JC 478·4), S 1·29. (Delezenne.) 1854*a*. Lille, old organ of La Madeleine restored.

3. *Chamber Pitch, Low.*

MA **402·9** [JA 400·4, EA 401·3], MA 482·0 [JC 480·5, EC 477·3.] B *natural* 450·5. S 1·48. (Ellis.) 1648, Paris, Mersenne's spinet. In the diagram which he gives (De instrumentis, lib. i., prop. 41) the keyboard begins with B *natural*, and (Harmonie Universelle, lib. iii., des instruments à chordes, p. 143) he says that the lowest string is in unison with the 4 foot pipe, for which I take Bédos's value (see A 376·6, and A 373·7.) In Germany Praetorius makes almost all the old organs begin with B *natural* (Syntagma Musicum, vol. 2, p. 112).

MA **403·9** [JA the same, EA 407·1], MC 483·2 [JC 484·7, EC 484·1], 1 F 646·2, S 1·52. (Ellis.) 1730, Padua. Copy made for me, under the direction of Prof. Rossetti, of the old lower F fork preserved in the bell foundry Colbacchini of Padua (see A 425·2 for references.) This is the nearest approach to Dr. R. Smith's Roman pitch-pipe (see (2) A 395·2) which I have found in Italy. It is nearly a semitone flatter than Colbacchini's pitch-pipe, and hence could not have been Zantedeschi's F, which he found to be a semitone sharper than these pipes.

MA **406·6** [JA 405·2, EA 405·8], MC 486·4 [JC 486·4, EC 482·6], 4 E 152, S 1·63. (Sauveur, "Mém. de l'Académie Française," 1713, p. 385.) Sauveur made many attempts to determine pitch, giving C 487 (whence MA 407·1), and A 408, as well as the present pitch. The C 487 is derived from V 121·75, which he obtains from his formula for the number of simple vibrations of a string, 40 Paris inches (42·631 Eng. inch) long, weighing 20½ grains French, and stretched by a weight of 92·160 grains, the whole length of the string between the bridges being 67 Paris inches (which is indifferent.) By the formula p. 298, n. 6, this gives only V 101·3, a very serious difference, so that there must be an error somewhere. In 1700 he considered the 5 (French) foot pipe to give 100 vib., but he corrects this in 1713 to 102, which he identifies with the lowest A of the clavecin, thus reaching A 408. Sauveur, in 1700 ("Hist. Acad.," pp. 134-143) wished to make the five foot pipe his standard of 100 vibrations. In his final memoir of 1713, he says that he made several experiments on four different days, in 1699, 1700, and 1704 at the works of the organ-builder Deslandes, in presence of Father Sebastien Truchet, and many others, using organ pipes of four and two feet, and that he found the E below the key of F-ut-fa made V 152. From this he calculated JC 243·4, and I have calculated the above. We have therefore from Sauveur, MA 407·1, A 408, MA 406·6, which agree fairly well, and also agree with Taskins' fork A 409, which see. It is to be observed that Sauveur mentions no particular clavecin, or organ, or opera, so that his results can only be looked upon in the light of experiments. On Sauveur's methods see end of Art. 17, p. 299.

M **407·1**, C 487. (Sauveur.) See A 406·6.

A **407·3**, EC 484·31 [MC 487·2, JC 488·9], S 1·66. (Delezenne.) 1854, Lille. Organ of St. Maurice, repaired. Apparently an old pitch preserved. It is exactly an equal semitone higher than Mazingue's old fork, A 384·3.

EA **407·9**, C 484·8 [EC 485·0, MC 488·0, JC 489·5], S 1·69. (Schmahl and Ellis.) 1762, Germany, Hamburg. St. Michaelis Kirche, organ built by Hildebrand, of Dresden, under the direction of Handel's early friend, J. Mattheson, the composer (1681-1764), who contributed 44,000 marks banco = £3,221 3s. 4d. towards its expense. It was in the chamber pitch of the period, and its pitch has never been changed. It is a magnificent organ, containing 68 speaking stops and 4945 speaking pipes, and by recent improvements of the wind, under direction of Herr Schmahl, it has been brought into first-rate condition. It is S 0·93, or almost an equal semitone flatter than French pitch, and is exactly a *just* (not an equal) minor Third flatter than the St. Jacobi organ, A 489·2. The pitch was measured from C and E *flat* by Herr Schmahl with forks measured by me. The EA from the C was V 407·7, but Herr Schmahl advised me to go by E *flat*; the difference is only V 0·2, and is quite unimportant. It is certainly now in equal temperament, and was possibly always meant to be so. As Mattheson knew Schnitger, the builder of St. Jacobi organ (See A 489·2), Herr Schmahl thinks that the just minor Third between the organs was intentional, and that while St. Jacobi was in the true high church pitch of the period, St. Michaelis was in the true chamber pitch. Certainly, these are the best existing representatives of these pitches.

A **408**. (Sauveur) see MA 406·6.

A **409**, MC 489·27 [JC 490·8, EC 486·38], S 1·74. (Lissajous, "Bull. Soc. Encour.," liv, 1865) 1783, Paris, Court Clavecins. Fork of Pascal Taskin, their tuner, tuned from A of oboe of Antoine Sallentin, of the Opera and Chapelle du Roi, given by Taskin to M. Pfeiffer, who possessed it in 1859, according to de la Fage.

A **410**, MC 490·46 [JC 492, EC 487·56], S 1·78. (Lissajous, "Bull. Soc. Encour.," liv, 1865.) Eighteenth century, Paris. Pitch-pipe found by Lissajous in the Cabinet of the Faculty of Sciences. Temperature under which it was measured, and force of wind not stated.

A **411·4**, EC 489·2 [MC 492·1, JC 493·7], S 1·84. (Schmahl and Ellis.) 1688, Germany, Hamburg. The Chamber Pitch on the former eight-foot Gedact of the organ of St. Jacobi Kirche, being an equal minor Third flatter than the church pitch of the organ itself, so that the C of this stop was in exact unison with the A of the other stops of the organ; see A 489·2.

A **413·3**, MC 494·36 [EC 491·4, JC 495·9], S 1·91. (Näke.) Germany, but neither date nor place mentioned. The Fork labelled "Schneider's oboe 826·5," formerly belonging to Herr Näke, and lent me by Frau Näke. My own measurement was the same as Herr Näke's. (See Delezenne's observations under (2) A 418.)

MA **414·4** [JA the same, EA 411·1], MC 495·7 [JC 497·3, EC 488·9] C *sharp* 518, S 1·96. (F. W. Marpurg, Versuch über die musikalische Temperatur, Breslau) 1776, Clavichords. This is the result of an experiment made by Marpurg to tune a stretched wire to his C *sharp*, and calculate its pitch by the formula, p. 208. This is a little flatter than Euler's MA 418. Marpurg himself determines JA, and then JD 276$\frac{1}{3}$, as a just Fifth below it, but this JD is in the major scale of A, and is therefore a comma lower than D in the scale of the JC here given, which is calculated as a just minor Third above the A. Of course we must not be too certain of the exactness of these numbers, on account of the method by which they were obtained.

4. *Mean Pitch of Europe for Two Centuries.*

A **415**, MC 496·5, [JC 498, EC 493·5] S 1·99. (Ellis.) 1824*a*, Dresden. Roman Catholic Church, built by Gottfried Silbermann, 1754; see A 418·1 for present pitch. The above was taken from a fork formerly chained to the wall, for the purpose of giving the pitch to the orchestra that always plays with the organ in this church; these chained forks seem to have been placed there by command of King Friedrich August der Gerechte (1763-1827), who would not allow the pitch of the organ to be changed. The fork I measured, which had the perfect chain and staple still attached, was lent me by Frau Näke of Dresden, and sent by Herr Moritz Fürstenau, librarian to the Court Theatre, in 1878. Attached to it was a label giving the pitch as 415·1083, from the late Herr Näke's measurements by Scheibler forks, from which mine differs only by 0·1 vib. Herr Näke gives the pitch of another of these forks, in his book, as 415·3055, so that 415 may be regarded as the pitch intended; these forks disappeared from the church after 1824. Herr Näke says that the pitch of the fork was selected by the Kapellmeister Morlachi and Carl Maria von Weber, assisted by the Court organ-builder Uthe, to give the pitch of the organ in spring and autumn.

A **415·5**, MC 497·1 [JC 498·6, EC 494·1], S 2·01. (Näke.) 1722, Germany, Dresden. Organ of St. Sophie, built by Gottfried Silbermann. Näke conjectures that this pitch was brought from Venice by the Kapellmeister Antonio Lotti, who, in 1717, first conducted a grand Italian opera in Dresden, before Augustus the Strong, and says it was then called chamber pitch. This may be the case, and I consider these pitches, A 415, 415·5 to 419·5 to be only flatter forms of the Mean Pitch A 422·5. In that case, however, Näke must have been in error in supposing there was another chamber pitch a whole tone lower, see A 375·2. That could only have been a low church pitch.

(1) MA **418·0** [EA 420·4, JA 416·7], C 500, S 2·11. (Euler, "De motu aeris," Nov. Com. Ac. Sci. Petrop., vol. xvi. for 1781, p. 335.) 1780, St. Petersburgh, organs. Euler, after remarking that in a tube of 1000 feet, open at both ends, the number of oscillations made by the air in a second would be 1000, and in one of eight feet would be 125 (these tubes are to be carefully distinguished from organ pipes) incidentally observes, "cui numero (125) respondet sonus in instrumentis musicis litera C indicari solitus." (To this number, 125, corresponds the note usually marked C in musical instruments,—by which perhaps organs are intended.) I do not think that either this or the former (see A 392·2) observations are to be taken as determining precise pitches. This pitch

is 1·11 eq. sem., about a great semitone sharper than A 392·2, which gives B *flat* 419·6, so that the two instruments would be related in the manner explained under A 454·2 and A 457·6.

2) **A 418**, MC 500·1 [JC 501·6, EC 497·1], S 2·12. (Näke.) 1760-90, Germany. A flute made by Floth gave this pitch when Näke observed it, but all determinations by flutes are most uncertain. Delezenne says (Lille Mem., 1854, p. 6): "A flute, an oboe or a clarinet gives the pitch in the orchestra; hence orchestral pitch is delivered over to the caprice of the manufacturer, and it also depends on the *embouchure* of the artist, as I have ascertained by my tonometer that the same flute gives different sounds in different hands. Similarly, I have established, in conjunction with M. Hermann, Laureate of the Conservatoire, and first flute in the Lille theatre, that a flute may be made to vary in pitch by 5·4 commas [= S 1·16], that is by more than a semitone, according to the closeness of the lips, and the force with which the lamina of air is driven against the edge or the middle of the hole. For this reason I have renounced my attempts to discover ancient orchestral pitches by means of old flutes, of which I had already formed a collection for that purpose." See (1) A 426·5.

A 418·1, EC 497·2 [MC 500·2, JC 501·7], S 2·12. (Ellis.) 1878. Germany, Dresden. Roman Catholic Church, Silbermann's organ, from a fork tuned for me by the Court organ-builder, Jehmlich, at 15° R, and reduced. For older pitch see A 415. The C was taken at the same time, and being similarly reduced, gave C 496·4, which is only ·8 vib. too flat. At what time equal temperament was adopted is not known.

MA 419 [JA 417·7, EA 421], C 501·3, S 2·15. (Ellis.) 1700c, London, organ of St. John's, Clerkenwell, attributed to Renatus Harris. When measured (1 Oct., 1878), the pressure of wind was very weak. It was ill regulated by broken gravestones as weights. The choir organ was measured, which is 1 vib. sharper than the great organ. It has the "short octave," see A 424·3 and pedal keys without pipes, and had originally no couplers. The organ has been put into equal temperament, but very slightly changed; the old temperament is here assumed. This organ is reported to be (at least part of) the one put up in the Temple in rivalry to B. Schmidt's, but the church books have been impounded for a lawsuit, and are inaccessible, so that this statement cannot be verified.

MA 419·5 [JA 418·2, EA 422], C 501·8, S 2·17 (Näke.) 1714, Saxony, Freiberg; organ built by Gottfried Silbermann. Näke says the pitch is A 422 equally tempered, but that the organ is *not* tempered. I presume then that he measured C, and then deduced EA. I have calculated backwards, and from C have calculated both MA and JA, and, thinking MA more probable, have calculated S from it. Näke may have confused JA and MA, being probably unacquainted with the latter. Näke conjectures that this pitch was introduced by Heinrich Schlitz in the 17th century from Italy, and that it had become gradually higher. He calls it Lombard pitch. He says also that this organ is in high church pitch, two semitones above chamber pitch. Taking this as one mean tone, it would give the chamber pitch at MA 375·2; see this pitch and also A 415·5.

(1) EA **419·6**, EC 498·93 [MC 501·8, JC 503·46], S 2·18. 1858 Madrid, ton de chapelle. This was calculated as an equal semitone lower than A 444·5 (which see) on the authority of de la Fage, but the temperament used may, after all, have been the meantone temperament. See next entry.

(2) A **419·6**. (Ellis.) 1785-90, Spain, Seville Cathedral. This fork was tuned by me, and sent to Seville to compare with the old organ of Torje Bosch (a Spaniard of Majorca) and was pronounced by the organist, Don Yñiguez, to be exactly in unison with 2 A of the organ at a mean temperature. He also informed me that in Spain they have not abandoned the system of Salinas, or the meantone temperament, and that the band played with the organ by screwing down the strings of bowed instruments, and adding pieces to the wind instruments for the occasion. He also said that this was the pitch of all organs in Spain. As the precise temperature was not stated, there may be an error of two or three vibrations, but not more, in supposing this mean temperature to be 59° F. It might thus be as high as Handel's pitch, A 422·5.

A 419·9 (measured 4 A 209·93), MC 502·3 [JC 503·8, EC 499·3] S 2·19. (Ellis.) 1715c, England. Roughly made old fork, belonging to Rev. G. T. Driffield, rector of Bow, possessor of Handel's fork, see A 422·5. This is a large rude tenor fork, pyramidical at end of stem, difficult to measure as its beats in the octave could scarcely be counted for more than 5 sec. Mr. Driffield thinks it was made by John Shore, the inventor of tuning forks, see Art 10 above. This 4 A would be the tuning string of the lute, and John Shore was lutist to the Chapel Royal.

MA 420·1 [JA 418·82, EA 423·6], C 502·6, S 2·20. (Ellis.) 1780, England, Winchester College organ, built by R. Harris 1681, and repaired by Samuel Green, 1780. The C measured at Messrs. Bishop's works was a stopped diapason, and Mr. C. K. K. Bishop, put the tuning ears in the ordinary position, but he may have possibly flattened it. The tone of the pipe was very dull. The pipe was one of Green's. See A 422·6.

A 421·3, MC 504·0 [JC 505·5, EC 501·0], S 2·25 (Näke.) 1780, Austria, Vienna. Fork of the Saxon organ-builder, Schulz, who lived in Vienna in Mozart's time, giving the pitch of organs then used. Herr Näke's full measure was 421·2885.

A 421·2, Russia, see Appendix No. 5.

A 421·6, MC 504·3 [JC 505·9, EC 501·3], S 2·26. (Näke and Ellis.) 1780, Vienna, pianos. Fork of Herr Stein, of Vienna, pianoforte maker to Mozart, in possession of his son-in-law, Streicher, the present great pianoforte maker at the same place. A copy of this fork, made for Herr Näke, was kindly lent to me by Frau Näke, and I measured it as above; Herr Näke had measured it as 421·3625. The difference is unimportant. Herr Näke usually cites it as 421·5. This was the pitch to which Mozart's clavichords and pianos were tuned, and this was in fact Mozart's pitch, being almost imperceptibly different from Handel's, A 422·5.

A 421·9, MC 504·7 [JC 506·2, EC 501·7], S 2·27 (Marpurg as cited by the French Commission.) 1752, Berlin, Opera. I have been unable to find this in any of Marpurg's works accessible to me, but see A 414·4. The pitch is very probable.

A 422, MC 504·8 [EC 501·85, JC 506·4], S 2·28 (Näke.) 1783, Germany. A clarionet in D with two keys, by A. Grenser. See Delezenne's observations under (2) A 418.

(1) **A 422·3**, MC 505·2 [JC 506·8, EC 502·2], S 2·29 (Näke). 1780. Dresden, fork of the former Court organist, Kirsten; in possession of the late Court Organist, Dr. Schneider.

(2) **A 422·3** (Ellis), 1780c, Verona. The bell foundry of Cavedini at Verona has two C forks, and one series of forks from C to B flat. Copies of all these forks were kindly made for me under the direction of Prof. Rossetti (see A 425·2 for references) with the assistance of Sig. Cavedini, who attested their accuracy. The C was believed to be the Roman C of 100 years ago. The following are the pitches of the whole series:—In the two foot octave, C 246·44, C *sharp* 263·64, D 281·24, E *flat* 292·72, E 317·54, F 330·27, F *sharp* 355·14, G 376·23. G *sharp* 405·72, A 422·34, B *flat* 449·44, the B *natural* is wanting. On examining the series, the forks will be found to be very imperfectly tuned. Every major Third is much too sharp, and hence every Fifth is slightly too sharp. Remembering that in equal temperament the Fifths are S 0·02 too flat, and the major Thirds S 0·14 too sharp, we may see how bad the present scale would be in harmony, where the Fifths *c g*, *e* sharp *g* sharp, *d a*, *e* flat *b* flat, are respectively S 0·31, 0·44, 0·02 and 0·40 too sharp, and the major Thirds *c e*, S 0·53; *c* sharp *c* sharp, S 0·04; *d f* sharp, S 0·18; *e* flat *g*, S 0·48; *e g* sharp, S 0·34; *f a*, S 0·39; *f* sharp *a* sharp, S 0·21; too sharp. Now Zantedeschi says that on comparing this C 246·4 with the (more recent) pitch-pipe of Colbacchini he found it was D, which has really V 288·9, and consequently concludes that the fork had risen a Tone. Probably the bad state of the pitch pipe rendered it impossible to measure with any degree of accuracy. Cavedini's C 246·4 is actually flatter than the C 252·13 of the pitch pipe, see A 425·2. Zantedeschi also says that the theatre at Verona used the Vienna A (which he estimates at V 265 to V 268), and was a semitone sharper than the C of the Colbacchini pitch pipe, which has C *sharp* 272·4. But the Vienna pitch seems to have been A 456·1 (which see) giving JC 273·6, which is indeed very nearly C *sharp* of the pitch pipe, so that if the least reliance could be placed on Prof. Z.'s observations (which I am afraid is not the case), the old Vienna pitch, as given by Streicher's fork, is confirmed.

(1) **A 422·5**, MC 505·4 [JC 507, EC 502·4], S 2·30. (Ellis.) 1751, England, from a copy made by myself (and compared with the original some months afterwards, when it was found perfectly exact) of Handel's fork. The box containing it bears this inscription:—"This Pitchfork was the property of the Immortal Handel, and left by him at the Foundling Hospital, when the Messiah was performed in 1751:—Ancient Concert, whole tone higher; Abbey, half-tone higher; Temple and St. Paul's organs exactly with this pitch. Presented to Rd. Clarke by I: Brownlow, the D." See 1835.—Invented by M. Shore, Serj. Trumpeter, time of H. Purcell." This fork was bought by Rev. G. T. Driffield, rector of Bow, near London, at the sale of the effects of Mr. Clarke, and by his permission I took and compared the copy. The fork is probably far superior to any made by John Shore, who (and not Mathias Shore, as the inscription implies) was the inventor of the Tuning-fork, see Art. 10, p. 297. This fork probably represents the exact pitch of the organ built by Messrs. Glyn and Parker (see (2) A 424·3), which was presented by Handel to the Foundling Hospital, and opened by him "on the 1st of May, 1750, when the concourse of persons was so great that the performance was repeated fifteen days afterwards. Upon one of these occasions the audience was conveyed in no less than 800 coaches and chairs" ("John Brownlow's History and Objects of the Foundling Hospital," third edition, London, 1865, p. 78). This fork was received by the secretary, John Brownlow, from his predecessor, who was in office from 1795 to 1849, and Mr. Brownlow in a letter to Mr. Driffield, dated May 21, 1848, says, that "in an unguarded moment" he gave it to Mr. Clarke. He did not remember the story of Handel's leaving it in the orchestra, and imagined that that might be "apocryphal." Mr. John Reid, a partner in Messrs. Broadwood's house, writing to Mr. Driffield on June 13, 1859, says that that house had once possession of Handel's fork, and they do not know how they came to lose it. (See Appendix No. 6.) Handel was a friend of Tschudi, the founder of the house. Richard Clarke, to whom the fork was given, died Oct. 5, 1856, aged 76½, and his effects were sold by auction, May 2, 1857, when Mr. Driffield bought both this fork and A 419·9. I am indebted to Mr. E. J. Hopkins, organist of the Temple, for furnishing me with a MS. note made by Mr. Leffler (d. 1819), organist of St. Katharine's, then by the Tower, with Mr. W. Russell, then organist of the Foundling, which describes the great peculiarity of this organ. It had the usual 12 keys to the octave, but a means of altering the notes sounded by four of them. There was a slider with three rests above the draw stops on each side. When the sliders were at the central rest, the 12 notes were the usual 12 of the meantone temperament, E *flat*, B *flat*, F, C, G, D, A, E, B,

F *sharp*, C *sharp*, G *sharp*. If the left-hand slider were put full to the left, E *flat* was changed into D *sharp*, and if the right-hand slider were put full to the right, B *flat* was changed into A *sharp*. If, however, the right-hand slider were put full to the left, G *sharp* was changed into A *flat*, and if the left-hand slider were put full to the right, C *sharp* became D *flat*. These three positions of the sliders may be indicated thus: Left hand, D *sharp* —(E *flat*, C *sharp*)—D *flat*. Right hand, A *flat*—(G *sharp*, B *flat*)— A *sharp*. The two notes in the parenthesis are the usual notes of the meantone temperament, when unaltered by the sliders. There were three separate sets of sliders for swell, great and choir organs. Mr. Hopkins always understood that this arrangement was due to Dr. Robert Smith, of Trinity College, Cambridge. The sliders, long disused and not understood, were removed by Mr. Bishop, by order of the organist, Mr. C. Edwin Willing, who was appointed in 1848, but "the organ was still tuned in unequal meantone temperament, to avoid the alteration in the pipes and any further expense" (letter from Mr. Willing, then organist, Sept. 21, 1863). Its present state, after rebuilding by Bevington, is described in "Hopkins on the Organ," ed. 1870, p. 467. As respects the indications of pitch in 1835, given by Mr. Clarke in the inscription on the box, it is possible that both the Temple and St. Paul's organs were originally tuned at A 441·7, but had been flattened (the first in 1843) by Mr. C. A. Bishop to agree with Sir George Smart's pitch, A 433·2, which would be probably considered the same as Handel's by Mr. Clarke. The Temple Organ and the oldest Durham organ had an E *flat* and D *sharp*, an A *flat* and G *sharp*, that is two and not four additional notes, and these were introduced by divided keys and not by sliders. The alteration of pitch was made partly by shifting, and partly by piecing the pipes. The Temple Organ was put into equal temperament about 1865, and then the back parts of the divided keys were unused. (See Appendix No. 9.) Mr. Clark must be in error respecting the Ancient Concerts, as these concerts were held in the Hanover-square Rooms after 1804. In 1805 that organ was built by Elliott, in the usual flat pitch of the time (that is about A 422·5); then it was sharpened by Hill, when Knyvett was conductor, 1831-7, and was probably put into Sir G. Smart's pitch (A 433·2. Afterwards, while Costa was conductor of the Philharmonic Concerts, 1846-54 (see A 452·5) it was sharpened to his pitch, certainly not S 1·2 above Handel, that is, very far short of a tone, though more than a semitone.

(2) A **422·5**. 1820*a*. England, Westminster Abbey Organ, built by Schreider and Jordans. The pitch is conjectural. Mr. T. Hill says it was a "flat organ," so that it must have been near this pitch, and that he sharpened it himself. The present pitch is therefore intentionally his standard, A 441·7. Dr. Stone's observations, in May, 1877, made it A 438. Mr. J. Turle, of the Abbey, informs me that the pitch was originally flat, but at the coronation of George IV., 1821, it was slightly raised, by desire of his predecessor, Greatorex; and that this pitch was unaltered when the organ was reconstructed by Mr. Hill in 1848, up to which time it had a "short octave," or was a G organ (see A 424·3), and in mean tone temperament. As Mr. Hill says, he sharpened it, most probably the organ was raised in 1821 from A 422·5 to A 433·2 (which see), or thereabouts as this was the pitch of the period, that is, by S 0·43, or not quite a quarter of a tone; and the subsequent smaller rise to A 441·7, or thereabouts, being only S 0·35, or a comma and a half, was not noticed. Organs are constantly raised slightly in pitch when reconstructed, owing to the trimming of the pipes and clearing the dust from the mouth. See end of notes on (1) A 427·2. But there is some reason to suppose that when the organ was first built in 1730, it was a very sharp organ (see A 474·1), and that it was flattened a whole tone before Mr. Turle knew it.

(3) A **422·5**. (Hill.) 1838, Bath Abbey Church as rebuilt by Smith, of Bristol. Sharpened by Mr. T. Hill, who told me that it was a "flat organ," and hence must have been near the pitch here conjecturally assigned. As it was originally built by the Jordans, it may have been much sharper at first (see A 474·1).

(4) JA **422·5**. (Ellis.) 1877 *a*. Tonic Sol-fa Standard, using JC 507 only, and the whole scale in just intonation. See (4) A 427·5.

(1) A **422·6**, MC 505·6 [JC 507·1, EC 502·6], S 2·30 Delezenne.) 1754*c*, Lille. Very old fork found in the workshops of M. François, sen., musical instrument maker at Lille Judging from its construction and that of its case, Delezenne considered it to be one hundred years old in 1854

(2) MA **422 6**. (Ellis.) 1790*c*, London; Samuel Green's organ at Kew Parish Church, built as a chamber organ for George III., and kept in Kew Palace till it was given to the parish by George IV. in 1824, quite untouched, and, when examined in 1878, in the meantone temperament.

(3) MA **422·6** [JA the same, EA 425·9], MC 505·5 [JC 507·1, EC 506·5], 1 F 676·15, S 2·30. (Ellis.) 1780*c*, Padua; copy made for me under the direction of Prof. Rosetti (see A 425·2 for references of the higher old F fork preserved in the bell foundry of Colbacchini at Padua. Prof. Zantedeschi mentions an F fork there preserved as old as 1777 at least, but says he found it a semitone higher than Colbacchini's more recent pitch pipe. But the octave of the F of the pipe measured by me see A 425·2), that is 2 F 343·6, is 1 F 687·2, which is very nearly the same as this fork. Colbacchini did not know which of their two F's Zantedeschi had examined, and sent me copies of both (see the other under A 403·9). Neither would agree with Prof. Zantedeschi's unfortunately inaccurate observations.

MA **422·7** [JA 421·4, EA 425·2], C 505·7, S 2·31. (Ellis.) 1800*c*, London; old fork belonging to Messrs. Broadwood.

(1) A **423·0**, MC 506·0 [JC 507·6, EC 503·0], S 2·32. (Drouet, as cited by Fr. Com.) 1810, Paris, Opera. The pitch is very probable; but as I have been unable to find the original account I do not know how it was obtained.

(2 A **423'** . McLeod actually 423·02; Ellis, 423·09.) 1820, France, Paris, Theâtre Feydeau, Opéra Comique; copy compared with the original by M. Cavaillé-Coll, and found "sufficiently exact") of the original (No. 494 of Catalogue preserved in the Musée du Conservatoire. The original is 3¾ in. from bend to point, converging prongs with a disk at end of stem, much spotted with rust, the disk being black with it; in a wooden case inscribed, "Feydeau, 1820; donné par M. Dauprat." My son measured the original as 423·06.

(1) MA **423·2** [JA 421·9, EA 425·7], C 506·3, S 2·33. (Ellis.) 1778, London; Green's organ at St. Katharine's Church, Regent's Park. A large fine organ, short octave (see MA 424·3, long keys white, still in mean tone temperament I measured A 423·6 on the instrument, but have calculated the above pitch of A from C as most likely to be correct; pipes evidently untouched, but ill-treated in tuning; coned in and out, and often jagged at the end (the 1 C was coned out, and the 2 A coned in).

(2) EA **423 2** [MA 420·7, JA 419·4], C 503·3, S 2·33, or if taken from MA 420·7, then S 2·22. (Ellis. 1815-21, Dresden; Band of the Opera. From a fork lent me by Frau Näke, of Dresden, contained in a box labelled, "Dresdener Kapelle, 1815–1821, c'." C. M. von Weber (1786–1826 was Kapellmeister at Dresden during this time. I have taken the EA in preference to MA, because it agrees more closely with the fork of Anton von Weber, his father see A 424·1. The pitch of the Dresden opera began to rise in 1821, according to Näke, in consequence of the celebrated flutist Fürstenau, then using a new flute made by Koch of Vienna. But as late as 1824 it was lower than in Munich. For present pitch see A 437·8 and references.

MA **423·3** [JA 422, EA 425·8], C 506·4, S 2·33. (Ellis.) 1813, London; Original Philharmonic. This is a second copy of Peppercorn's fork see first in MA 423·7), prepared for the Society of Arts in 1860 (now in possession of Messrs. Broadwood); but whether this or the other is the better is uncertain. The difference is only ·02 eq. sem. (See Appendix No. 7.)

MA **423·6** [JA 422·3, EA 426·1], C 506·7, S 2·34. (Ellis.) 1800*c*, London; old fork belonging to Messrs. Broadwood.

MA **423·7** [JA 422·4, EA 426·2], C 506·81, S 2·35. (Ellis.) London, 1813; Original Philharmonic. This is a copy (in the possession of Mr. Hipkins) made before 1860, of the original fork (now lost) by which Mr. Peppercorn, of Broadwood's, tuned the pianos of the Philharmonic Society, from its foundation in 1813 to 1828. Mr. Hipkins believes that this fork was settled in a consultation of Sir George Smart (conductor) with Braham tenor), Griesbach (oboist), and Mrs. Billington (soprano, who left England in 1817). For other pitches of Sir George Smart, see A 433 and 433·2; see also MA 423·3. (See Appendix No. 7.)

A **424**, EC 504·2 [MC 507·2, JC 508·8], S 2·36. (Näke.) 1862, Germany, Dresden. Orchestra of the Roman Catholic Chapel, according to Näke, who says that, consequently, the organ can agree with it only in the hottest days of summer. If we suppose the organ to have been at A 418·1 (which see) at 59° Fahr., then temperature must rise to 72·6° Fahr., according to the usual formulæ of reduction, before the organ would agree with this orchestral pitch. When the instruments were taken to the Opera-house in 1862, for experimental performances of Mozart's operas, Näke says they rose from A 424 to A 427·5, through the mere heat of the house.

A **424·1**, EC 504·3 [MC 507·3, JC 508·9], S 2·36. (Näke.) 1740—1812, Germany; Eutin (18 miles N. of Lübeck, in North Germany, of which principality it was capital, though surrounded by Holstein). Fork of Franz Anton von Weber, father of Carl Maria von Weber. As equal temperament was, in intention, used at this early period in Hamburg, and probably Lübeck for the very sharp organs there, I have placed EC first. Compare A 423·2. Näke's precise measure of this fork is 424·0665.

(1) MA **424·2** [JA 422·9, EA 426·7], C 507·3, S 2·37. (Ellis.) 1619, Brunswick. "Suitable" Church Organ Pitch. Prætorius ("Syntagma Musicum," vol. ii., p. 231–2) gives what he terms "a correct drawing of the proper church-pipe measure for c''', or the half-foot tone of the organ-builders;" that is, ½ C. This figure gives the dimensions of the whole octave from ½ C to ¼ C. It is a rough woodcut, on very bibulous paper, which must have shrunk much in drying. At the back of the title of the "Theatrum Instrumentorum seu Sciagraphia," in the same volume, Prætorius gives a scale of six Brunswick inches, which, on the figure, measure 140·5 mm. in place of 142·68 mm. Dividing the latter by the former, we obtain 1·0155 as the multiplier of the dimensions of the drawing to correct for shrinkage. The actual drawing on the paper gives 133·8 mm. for the length, and 25·2 mm. for double the side of the square pipe, corresponding to ½ C. Multiplying by 1·0155, we find 135·87 and 25·59 respectively. Doubling the first to get the 1 C, we have 271·74 mm. for the length, and 25·59 mm. for the side of the square of a wooden pipe giving is recommended pitch. I had a wooden pipe constructed which was 272 mm. long and 25·5 mm. in the side, and spoke 503·6, 507·25, and 511·86 under pressures of 2½, 3½, and 4 inches respectively. Correcting this by rule p. 296, by multiplying by 323 $= 272 + 2 \times 25{\cdot}5$) and dividing by 322·92 $= 271{\cdot}74 + 2 \times 25{\cdot}59$), we obtain C 503·7, 507·4 respectively; practically, the same as before (the errors in length and side being in opposite directions), giving

MA 421·1, 424·2, and 428·0 respectively. As 3¼ in. was, according to Herr Schmahl (see "Authorities"), almost precisely the force of wind used by Praetorius, I assume the second as most correct, and hence obtain the above figures. This is the "mean pitch," being practically the same as Handel's A 422·5, and it is the earliest example of it that I have found. It was not then the ordinary pitch, but it was, in Praetorius's mind, the most suitable. It was this pitch to which Praetorius must have referred when he said that the Halberstadt organ, A 505·8, was a good Tone, and nearly a Tone and a half sharper than the suitable church-pitch (*als die unsrige itzige Chormessige Werke stehen*. The difference of pitch was S 3·04, just an equal minor Third; and just less than S 3·103, the meantone minor Third. These two pitches, therefore, confirm each other. The lengths and sides of the other pipes in the Octave were not engraved with sufficient accuracy to draw out the exact temperament; but, as Praetorius explains how to tune in the meantone temperament, and no other perfect major Thirds, and Fifths a quarter of a comma too small, there was no necessity to attend to the pitch of any but the lowest note, which had the longest pipe, and was, therefore, in all probability, most accurately rendered in the woodcut. (See Art. 26, p. 308.)

(2) **A 424·2**, EC 504·4 [MC 507·4, JC 509·0], S 2·37. (Fischer; for references and explanations, see A 437·3.) 1823, Paris; Italian Opera. Mean of 20 trials. The fork measured was 4 A 212·08, and was given by Spontini. Probably, MC should be used. I have used Fischer's V 424·17, but this requires the length of the string to be 23·721, and not 23·712, Prussian inches, as he gives it, and I consider this transposition of 1 and 2 the most probable misprint.

(1) MA **424·3** [JA 423·0, EA 426·8], C 507·6, S 2·37. (Ellis.) 1750*c*, London. Old forks, formerly belonging to the late Prof. Faraday, lent me by Mr. Blaikley, of Messrs. Boosey. The C 507·6 was clearly a common music-shop fork, giving the pitch of 1750 and later. Calculating from this JA *flat* 406·1, JE *flat* 609·1, JA 423·0, as just minor Thirds, to JF 338·4, and C, and comparing them with the forks of the set A *flat* 404·7, E *flat* 609·5, A 422·7, there seems little doubt that these were attempts at tuning the former correctly by ear. These were made for lecture purposes, most probably. The MA 424·3 is selected to take the pitch from.

(2) MA **424·3** [JA 422·8, EA 426·7], C 507·4, S 2·37. (Ellis. 1749, London. Glyn and Parker's Organ, at All Hallows the Great and Less, Upper Thames-stret. This firm (who lived at Salford Manchester were the builders of the organ which Handel presented to the Foundling Hospital, and which had probably the pitch of Handel's fork (see (1) A 422·5). The organ is now in equal temperament, and the actual pitches of A, B, C, in September, 1878, were A 426·7, B 478·0, C 507·4, which are very closely the equal temperament A 426·7, B 478·9, C 507·4. The organist Mr. Yeatman) informs me that equal temperament has been adopted for some time, but I have adopted the old MA. The organ has no couplers, an octave of pedal keys, but no pipes, very shallow touch, a raised cornet on the great organ, a "short octave"—that is, the lowest notes are G, C, A, D on the keys which look to be B, C, C *sharp*, D; great and choir organ 4½ octaves, swell 3 octaves. The B pipe is exactly 12 in. long, and 0·95 in. in diameter. Organ inscribed, "Erected by voluntary subscription of these United Parishes, A.D. 1749." The pitch was taken from the choir organ, the C of which was exactly of the same pitch as that of the great organ. Probably owing to the residence of the builders at Salford, A. Jordan was its first caretaker. Dr. Boyce was organist in 1749.

EA **424·4** [MA 421·9, JA 420·6], C 504·7, pressure 3¼ in., S 2·37. (Ellis. 1833, Weimar; organ. J. G. Töpfer, an organist and author of a well-known work on the organ chiefly adapted from Bédos in his "Orgelbaukunst," p. 41, gives for his wide principal 1 C a pipe 1 Weimar foot = 282 mm. long and 15·76 Weimar lines = 30·86 mm. in diameter. I had a pipe constructed 279·5 mm. long and 30 mm. in diameter, which spoke V 510·1, 510·7, 512·9, under pressures of 2¾, 3¼, and 4 in. respectively. Reducing these for a pipe of the proper dimensions see rule p. 296 by multiplying them by 988·5 = 3 × 279·5 + 5 × 30·86 and dividing them by 1000·3 = 3 × 282 + 5 × 30·86) we obtain C 504·1, 504·7, 506·9 respectively, giving EA 423·9, 424·4, and 425·9 respectively, where I use EA, because Töpfer says that the unequal temperament had been almost entirely superseded by the equal. But the value of C belongs to the time of meantone temperament, and the three MA are 421·4, 421·9, 423·7 respectively. The middle pressure is most probably correct.

A 424·6, MC 507·9 [EC 505·0, JC 509·5], S 2·38. (Ellis.) 1800*c*, England; old fork said to have been used at Plymouth Theatre at the beginning of 19th century, lent me by Dr. Stainer.

A 424·9, MC 508·3 [JC 509·9, EC 505·27], S 2·39. (Nüke.) 1800*c*, Germany; fork of the bassoonist Kummer, sen.

A 425·2, MC 508·7 [JC 510·2, EC 504·5], S 2·41. Ellis.) 1730*c* and 1780*c*, Padua; two ancient pitch-pipes belonging to the bell foundry of Colbacchini at Padua, and kindly lent to me at the request of Sig. F. Rossetti, professor of physics at the University of Padua, in order that I might verify some experiments made upon them by Prof. Zantedeschi, his predecessor (died 1873). The foundry was established in 1730, and the older pipe, which extends from 4 B to 1 F *sharp*, is believed to be of that date; but the more recent one, which extends from 4 A to 1 A, is believed to be fifty years more recent. It was the latter, with 2 octaves, which Prof. Zantedeschi had used, and he treated it as proceeding in just intonation from 2 C 256. When they came into my hands both pipes were unusable, and could not be made to give any intelligible note, so that any pitch might have been assumed for them. I put them into the hands of Messrs. Hill & Sons, the organ-builders, who softened the leathern pad at the end of the piston, and made them speak easily, without any alteration of the mouth or length, and prepared an adapter, so that both could be tried on a proper bellows. Each A was measured on two different days, and the results reduced to 59° F. The older pipe gave V 425·7 and V 426·73; the newer pipe gave V 422·2, and V 426·3; both under 2¼ in. of wind, which was as much pressure as they could well bear. As there was no means of determining the pitch of such an instrument accurately, for it probably varied every time it was used, I have assumed the mean of all four measures as the possibly intended value of both A's. It was necessary to employ different pressures with the older pipe, to bring out the notes, and I always used the smallest possible. The pitches of the 2 ft. octave of the two pipes were as follows, reduced to 59° F.:—Older pitch-pipe 1½ in. C 250·4, C *sharp* 265·6; 1¾ in.) D 283·6, E *flat* 299·0; 2 in.) E 317·9, F 337·2; (2¼ in.) F *sharp* 357·9, G 380, G *sharp* 403·5; 2¼ in.) A 426·7 or 425·7; (2½ in.) B *flat* 453·8, B 479·4, C 509·6, which is considerably sharper than the true octave 500·8 of the lower C. The pitches of the notes in the same octave in the more recent pitch-pipe are as follows: the pressure being 2¼ in. throughout and * marking those pitches which were taken on the second day—C 252·13, *C *sharp* 272·4, *D 288·9, *E *flat* 304·8, E 325·6, *F 343·6, *F *sharp* 362·0, G 378·1, *G *sharp* 403·7, A 422·2, or *426·3, B *flat* 444·9, B 469·5, C 497·5, which is a good deal flatter than the true octave 504·3 to the lower C. It is evident that this was very different from a justly intoned octave to C 256, as was assumed by Prof. Zantedeschi in his memoir on the variability of tuning-forks, Sitz. Ber. Math. Kl. k. Acad. der Wiss. Vienna, 1857, p. 172, and that all measurements of pitch made with this pipe must have been faulty. For the forks examined by Prof. Zantedeschi see A 403·9, (2) A 422·3, (3) A 422·6, A 436·6, A 483·7. The above pitch-pipe scales should be compared with Cavedini's forks (2) A 422·3. All three were supposed to be Roman pitch of one hundred and fifty years ago, but look more like Lombard pitch. (See Art. 26, note 10, p. 309.)

A 425·5, EC 506 [MC 509, JC 510·6], S 2·42 Lissajous, reported by de la Fage), 1829, Paris. Pitch of opera piano as distinct from the orchestra (see A 425·8 and (2 A 434), verified by Monneron for A. de la Fage.

1 **MA 425·6** [JA 424·3, EA 428·1], C 509·1, S 2·42. (Ellis.) 1740–80, England; Schnetzler's organ at the German Chapel Royal, St. James's Palace. A chamber organ, formerly at Buckingham Palace, with C untouched, but put into equal temperament, having actually A 428·4, which, as seen above, is nearly correctly EA, but I have taken the pitch from MA 425·6, as that belonged to the time when the organ was built. *Schnetzler's* name is so spelt on an organ belonging to Mr. Drew of Dublin. English books generally give *Snetzler*.

2 **A 425·6** (Hill. 1764, England, Halifax; one of Schnetzler's organs sharpened by Messrs. Hill & Son. The pitch is presumed to be the same as that of Schnetzler's German Chapel organ, for Mr. T. Hill said, it was "flat," and the organist Mr. Frobisher had always to transpose a semitone, in case of having to play with other instruments, at festivals.

1 **A 425·8**, EC 506·3 [MC 509·31, JC 510·9], S 2·43 (Lissajous, from de la Fage. 31 March 1824, Paris, opera. Pitch suddenly lowered for Mdme. Branchu, whose voice was failing. The piano for rehearsals was also lowered, and was not raised immediately when the orchestra was raised. The piano was said to be of *opera pitch*. See A 425·5.

2 **A 425·8** de la Fage. 1839, Italy, Bologna; pitch of fork used by Tadolini, the best tuner in the town, to tune A. de la Fage's piano.

MA 425·9 [JA 424·6, EA 428·4], C 509·5, S 2·44. Tunbridge and Ellis. 1740, England; St. George's Chapel, Great Yarmouth, retaining the original pitch, though put into equal temperament in 1840; built by Byfield, Jordan, and Bridge. The pitch of C was measured by beats with a fork counted by the organist Mr. T. Tunbridge, and the fork subsequently measured by me. The organ had originally a short octave (see 2) A 424·3), but it had no quarter tones, as has been reported.

(1 **A 426·5**, MC 510·2 [JC 511·8, EC 507·2], S 2·46. (Delezenne, as cited by de la Fage. 1800*c*, Germany ?); a flute by Holtzappel, bought in 1805. See Delezenne's observations under (2) A 418.

(2) **MA 426·5** [JA 425·0, EA 429·0], C 510·14, S 2·46, pressure 2¾ in. (Ellis. 1843, England, Wimbledon Church, built by Messrs. Walker; from a pipe preserved by them.

A 427·0, EC 507·7 [MC 510·8, JC 512·3], S 2·48 (Scheibler, "Tonmesser," p. 52, No. 1, gives A 426·75 at 69° F, here reduced to 59° F. 1811, Paris, Grand Opera. Scheibler does not trust it so much as A 434·0. A. de la Fage gives the date 1811, but cites the pitch as A 426·735.

1 **MA 427·2** [JA 425·8, EA 429·7], C 511·0, S 2·49. (Ellis.) 1878*a*, Norwich. Organ of Norwich Cathedral as it was in the mean-tone temperament before it was altered by Messrs. Bryceson in that year, measured from a pipe tuned as the octave below a ½ C pipe, just brought from the organ by Messrs. Bryceson, and cleaned. In June, 1877, Dr. Buck, who was then organist, tuned a fork to it, which I measured it as A 431·6; but the temperature was not stated, and probably may have been high, since 69° F. would give the same pitch as above. The building of the organ is attributed to Renatus Harris, though an open diapason was added by Byfield. The organ had been much altered at

various times, but it apparently retained the pitch R. Harris used at St. Andrew, Undershaft, London. (See A 427·7.) The little pipe measured seemed to be quite untouched. The pitch has now been somewhat raised by Messrs. Bryceson. It was intended to be raised to French pitch, but from the state of the pipes it was found necessary to make it higher.

(2) MA **427·2**. (Ellis.) 1826 *c*, London; old fork belonging o Messrs. Broadwood. See (2) A 427·5.

(1) A **427·5**, MC 511·4 [EC 508·4, JC 513], S 2·50. (Lissajous from de la Fage.) 1800 *c*, London; old fork in possession of Adrien de la Fage in 1859.

(2) MA **427·5** [JA 426·2, EA 4·30], C 511·4, S 2·50. (Ellis.) 1826 *c*, London; old fork belonging to Messrs. Broadwood.

(3) A **427·5**. (Näke.) 1862, Dresden Church Orchestra, when ransferred to the theatre. See A 424.

(4) JA **427·5** [MA 428·8, EA 431·4], C 513, S 2·50. (Ellis.) 1877 *a*, London. Standard fork of the Tonic Solfa College up to 1877. It had been intended for 512, and obtained from the siren and Koenig's fork, which is 512·55. But finding that it measured 517·8 by Appunn's tonometer, Mr. Curwen, the president of the College, resolved to adopt Appunn's 512 as his standard. This would be about 508, and would be as nearly as possible JC to Handel's pitch (see A 422·5), as it would give JA 423·4. Actually the forks sold are often C 507, which is exactly JC to Handel's A. As the Tonic Solfaists sing in just intonation, JA is used above for the determining pitch.

A **427·6**, EC 508·5 [MC 511·5, JC 513·1], 4 A 218·8, S 2·50. (Fischer, for references and explanations see A 437·3.) 1823, Paris, Théâtre Feydeau, or Opéra Comique; fork given by Spontini, mean of 20 trials. Probably mean temperament is more correct. By a typographical error in his abridged table, p. 211, Fischer gives the pitch as A 408 in place of A 428, and this had misled Bindseil and probably others.

MA **427·7** [JA 426·4, EA 430·5], MC 511·7 [JC and EC the same], 2 G *sharp*, 399·74, S 2·51. (Ellis.) 1696, London; old organ of St. Andrew, Undershaft, built by Renatus Harris. The pipe measured was a G *sharp*, the double octave major Third of S E, marked *Tee*, a solitary pipe preserved by Messrs. Hill and Sons when they rebuilt the organ. This is considered as the just major Third of E, as E is of C, in accordance with the meantone temperament. This gives MC identical with JC, and this C is taken as the starting point for equal temperament also, and then the other pitches were calculated as above. The pipe had no ears, and the upper lip was slightly arched. (See MA 434·7.

A **427·8**, MC 511·8 [JC 513·4, EC 508·7], S 3·51. (Ellis.) 1788, Windsor Castle, St. George's Chapel, built by Green, and presented by George III. It has evidently been sharpened through trimming. (See (2) A 422·6.) On 10th February, 1880, I measured A 427·8, B 478·6, C 511·5, at 59° F. Calculating from the measured A, and assuming meantone temperament, we should have B 478·3, C 511·8; calculating from the measured C, we should have had A 427·6, B 478. Hence the A, B, C, were very accurately in meantone intonation, as was intended.

MA **428·4** [JA 427·2, EA 431·0], C 512·5, S 2·54. (Ellis.) 1826, London; old fork belonging to Messrs. Broadwood.

(1) MA **428·7** [JA 427·3, EA 431·2], C 512·8, S 2·55. (Ions.) 1670, St. Nicholas, parish church of Newcastle-on-Tyne, built by Renatus Harris. It has been frequently improved and added to, but the pitch does not seem to have been altered (see A 427·7 with which it is practically identical). "It has been tuned in equal temperament since 1842, when it was altered for the Grand Musical Festival of that year. Sir George Smart then complained of the lowness of the pitch, and several of the orchestra found it difficult, if not impossible, to tune to it. Mr. Nicholson, the organ-builder, who made the change, is still living, and he says that C was not altered by him." Letter from Mr. W. J. Ions, the organist, who took the pitch by beats with a fork measured by me, at a known temperature, here reduced to 59° F.

(2) A **428·7**, MC 512·8 [EC 509·8, JC 514·4], S 2·55. (Delezenne, 1800*c*, Lille.) Fork in the possession of the family of M. Cohen for more than 50 years before 1854. The case is of an ancient form.

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5. The Compromise Pitch.

A **430·0**, MC 514·4 [JC 516, EC 511·35], S 2·60. (Lissajous, Bull. Soc. Encour., liv. 1865.) 1810*c*, Paris; fork belonging to a celebrated amateur, M. Lemoine, acquainted with all the principal artists, and head of an institution. A. de la Fage supposed it was intended for EA to C 512. In that case it was merely a fancy fork at that period.

MA **430·3** [JA 427·6, EA 432], MC 514·8 [JC 513·2, EC 513·8], 2 G 384·9, S 2·62. (Ellis.) 1826 *c*, London. Old G fork, formerly belonging to Faraday, lent by Mr. Blaikley, of Messrs. Boosey's. An isolated fork, and apparently intended for JG 384 to C 512. If, however, we take meantone temperament, we have almost exactly the pitch of Fulham Parish Organ before it was put into equal temperament (see A 430·4); so it may have been simply a music-shop G of about 1826.

MA **430·4** [JA 429·1, EA 433·05], C 514·87, S 2·62. (Ellis.) Fulham Parish Church organ, built by Jordans, 1701, but tuned to equal temperament by H. Jones, 136, Fulham-road, about 1858, who does not remember altering the pitch. I have therefore arranged it under meantone temperament. On measuring I find EA 433·8 tolerably correct, and EB 486·9, each nearly ·8 vib. too sharp. The pitch may be that of Gray and Davison, who had it in hand 1830, as the pitch belongs to that period.

A **430·5**, EC 512·0 [MC 515·0, JC 516·6, S 2·62. (Wieprecht, cited by French Commission.) 1806-14, Berlin, Opera. The original statement by Wieprecht has not been found. The pitch may have been C 512, whence the French Commission calculated EA 430·5, which may have been right, but the date implies MA 428 (whence S 2·52) and JA 426·7. The pitch is therefore doubtful, A. de la Fage says that Marloye proposed this 2 A as a standard, which amounts to selecting 1 C 512.

A **430·8**, EC 536·4 [MC 539·6, JC 541·3], S 2·63. (Drouot in French Commission.) 1830. France, Paris Opera. The original account has not been found.

MA **431·3**, Lavenham Bell, see Appendix No. 7, end.

(1) A **431·7**, EC 513·4 [MC 516·4, JC 518], S 2·67. (Fischer, for reference and details see A 437·3.) 1826, Paris Grand Opera. The fork, which measured V 215·85 was given to Fischer by Spontini. The vibrating length of string used was the mean 30 experiments. By an error of calculation Fischer gives the pitch as V 431·36, and consequently, in his table, p. 211, where he only gives the pitch to whole numbers, he gives it as A 431 in place of A 432. Or if his result is right, then the length of his wire was 23·164 Prussian inches, in place of 23·307 as he gives it.

(2.) MA **431·7** [JA 430·3, EA 434·2], C 516·4, JE 322·8, S 2·67. (Ellis.) 1826*c*. London. Old forks formerly belonging to Prof. Faraday, lent by Mr. Blaikley of Messrs. Boosey's, compare 1 A 424·3. The C is apparently a music-shop fork of the transition period, see A 433·2, to which the E was tuned as JE below.

A **432**, PC 512 [EC 513·7, MC 516·8, JC 518·4], S 2·75. (Meerens.) 1876, Brussels. In a paper presented to the Institute of Geneva, 21st of October, 1876, and printed separately, as "Mémoire sur le Diapason" (Brussels, 1877), M. Ch. Meerens proposes this as a standard, from a paper by M. Elie Ritter in vol. viii. of Trans. of Inst. Gen., where M. Ritter, bases the choice on 432 being a multiple of 2 and 3. M. Meerens takes it as the PA to C 512, as it would be tuned on a viôla having 4 C 128, 4 G 192, 2 D 288 and 2 A 432, and considers that this is the only proper A to the tonic C 512, inasmuch as the JA 426⅔ belongs to the tonality of F 341⅓. This again depends upon his peculiar view of the scale, which does not allow the scale of C to be composed of four notes, forming three perfect Fifths, as F, C, G, D, and the major Thirds to the three first, A, E, B. But composes it of the four notes C, G, D, A, forming perfect Fifths, and the major Thirds E, B, to the first notes, C, G, with the minor Third F to the third note D. The notes F and A in this case are then a whole comma higher than in the former. In this scale the subdominant chord, F, A, C, would be a strong dissonance, and consequently no written music using that chord would be endurable on his scale unless it were taken in the key of F. I am not aware that this standard has ever been used.

A **432·2**, EC 514·0 [MC 517, JC 518·6], S 2·69. (Delezenne.) Lille, 1854*a*. Organ of St. André, repaired, and probably retuned to the chamber pitch of the time. It is exactly one tone higher than St. Sauveur at Lille, see A 384·6. Temp. not stated.

MA **432·3** [JA 431, EA 434·9] C 517·2, S 2·70. (Ellis.) 1846*c*, London. Old fork in possession of Messrs. Bryceson, organ-builders, which belonged to their father, and had not been tuned for more than 30 years before 1878, but it had been unwillingly sharpened a little before that time. It probably shews the rise in the Philharmonic pitch then made (see A 433·2) which Mr. Bryceson, senior, seems to have objected to.

MA **432·6** [JA 431·3, EA 435·2], 2 C 258·77 (whence 1 C 517·54), S 2·71. (Ellis.) 1846*c*, London. Old fork bought by me about 1863 (see A 433·7), but belonging to the time of meantone temperament.

MA **432·8** [JA 435·4, EA 435·4], C 517·8, 1 E 647·2, S 2·72. (Ellis.) 1826 *c*, London. Old forks formerly belonging to the late Prof. Faraday, lent by Mr. Blaikley, of Messrs. Boosey. The C was nearly correctly Sir G. Smart's (see A 433 and 433·2), and the E was perfectly tuned as a just major Third above.

A **432·9**, MC 517·8 [EC 514·7, JC 519·4], S 2·72. (Delezenne.) Cited as an "old fork" in Delezenne's table, 1854, without further specification.

MA **433** [JA 431·7, EA 435·6], C 518, S 2·72. (Ellis.) 1820*c*, London. Fork approved of by Sir George Smart, conductor of the Philharmonic, in possession of Mr. Hipkins. This seems to have been a second fixing (see MA 423·7.) This was in general use in the shops as "the London Philharmonic" from 1840 to 1846 but it was not the pitch of the Philharmonic at that time. The mean temperament is employed because it was the only one used by Sir G. Smart. If equal temperament is used, this C 518 (see A 433·2) gives practically modern French A 435·4, which was thus anticipated by 30 years in England, and is found on many restored organs. Used in this way, it is Broadwood's lowest pitch, and is London No. 1 of the French Commission of 1858-9, where the report gives it as A 434, which is much better than for No. 2 and No. 3 (see A 445·5 and 452·5.) Another copy prepared for Society of Arts in 1860, gives C 517·72, still nearer to modern French pitch.

(1) A **433·2**, MC 518·2 [JC 519·8, EC 515·1], S 2·73. (Ellis.) 1828 according to Mr. Hipkins), London. Sir George Smart's own Philharmonic fork, left by him to the late Mr. John Black, and now in the possession of Mr. Algernon Black; the original fork is in a well-worn plaid silk case. This pitch was adopted, after a consultation, as a kind of standard, and was used as such by organ-builders. Sir G. S. considered that this fork agreed with the C 518 given under A 433, which proves that he

used the mean tone temperament. To this pitch Mr. C. A. Bishop tuned the Temple and St. Paul's organs (see end of A 422·5).

MA 433·5 [JA 432·1, EA 436], C 518·52, S 2·74. (Ellis.) 1846 *a*, London. This is the same fork as that entered under (2) EA 436, for the reasons there stated.

(1) MA 433·6 [JA 432·3, EA 436·2], C 518·8, S 2·75, pressure 2¾ in. (Ellis.) 1830 *c*, Ireland, Belfast, Christ Church. Date conjectured from the pitch, which may have been altered between 1820 and 1850. From a pipe at Messrs. Walker's organ works.

(2) MA 433·6, C 518·8 (Byolin and Ellis), Shrewsbury, St. Mary's, originally built by Byfield and Green; pitch probably altered by Messrs. Gray and Davison, 1840 *c*. Pitch of C measured by the organist, Mr. Byolin, by means of a fork measured by me, and then reduced. The organ is still in meantone temperament.

MA 433·7 [JA 432·3, EA 436·2], C 518·77, S 2·75. (Ellis), 1846c, London. Old fork bought in London, at the same time with C 258·77 (see MA 432·6) of which it apparently was meant to be the Octave. Belongs to A 433·2, hence pitch is reckoned from MA.

A 433·9 EC 516·0 [MC 519·0, JC 520·7], S 2·76. (Scheibler, "Tonmesser," No. I, 433·68 at 69° F, here corrected for temperature.) 1834c, Vienna orchestra, fork belonging to Scheibler or his friends. This is the lowest of the Vienna forks cited by Scheibler, and is apparently that referred to as "Vienna minimum" by Delezenne, who gives only A 433. It is also cited as a minimum by de la Fage, who gives the right number.

(1) A 434, EC 516·1 [MC 519·2, JC 520·8], S 2·76. (Cagnard de la Tour, from Cavaillé-Coll, "du Ton Musical," p. 13). 1819, Paris. No other particulars given.

(2) A 434. (Cagnard de la Tour from de la Fage.) Paris, 1829; opera. Fork verified at the time by M. Montal, piano maker. This was after the orchestra of the opera had recovered its pitch (see A 425·8), which is said to have happened thus:—"Jean Mengal, corniste solo, qui montait difficilement, avait, sans en rien dire à personne, fait raccourcir son cor, et ses camerades avaient peu à peu ou repris les anciens ou fait couper les nouveaux qu'on leur avait fournis, tandis que les instruments à cordes s'étaient remontés tout naturellement." A. de la Fage, see above p. 310, col. 2, bottom. The opera piano remained at the low pitch (see A 425·5).

(3) A 434·0. (Scheibler, Tonmesser, p. 52; No. 2, given as A 433·75 at 69° F., here corrected to 59° F.) 1834 *c*, Paris, opera. Fork made by Petitbout, luthier de l'opéra, and trusted by Scheibler, because he knew the maker to be skilful.

A 434·3, MC 519·5 [JC 521·2, EC 516·5], S 2·78. (McLeod and Ellis.) 1818, France, Paris; organ of the Chapelle des Tuileries. Copy (compared with the original by M. Cavaillé-Coll, and found "sufficiently exact") of a fork (No. 493 of the catalogue) preserved in the Musée du Conservatoire. The original is of the same size and shape, down to the conical brass cup, as (1) A 439·5. The mean pitch of the fork, as measured by my son, was A 434·4. Label attached, "Chapelle Royale, No. 3." There are a few spots of rust, but no stamped marks or letters. This was evidently tuned to the pitch of the opera of the time (see A 434, (1) and (2).

A 434·5, EC 516·7 [MC 519·8, JC 521·4], S 2·78. (Ellis.) 1869, Germany, Baden. Fork sent officially to the Society of Arts, and lent to me. Intended for diapason normal (see A 435·4).

MA 434·7 [JA 432·1, EA 433·0], MC 520·1 [JC 518·5, EC 515·0], B *natural* 486·1, 3¼ in. pressure, S 2·79. (Ellis.) Experimental pipe to represent All Hallows, Barking, built by Renatus Harris. The 2 B *natural* of this organ had, as I was informed by Mr. Hill, a pipe 12 in. long and 1 in. in diameter. I had a pipe made 12 in. long and ·95 in. in diameter, which spoke V 486·9, 488·7, and 490·5 at 2¾, 3¼ and 4 in. pressure. Correcting according to the rule on p. 296, by multiplying by 40·75 ($= 3 \times 12 + 5 \times 95$), and dividing by 41 ($= 3 \times 12 + 5 \times 1$), there result B *natural* 483·9, 486·1, 487·5, giving MA 432·8, 434·7, 436·0 respectively. Selecting the second as most probable, we obtain the above figures. It is, however, not unlikely that this pitch may have been sharper than that of the real organ. Compare the copy of B. Schmidt's pipe (1) A 445·8, and compare A 427·7 for Renatus Harris's St. Andrew's, Undershaft, and A 428·7 for his St. Nicholas, Newcastle, which are more probably correct. Perhaps one cause of the difference lay in the mouth of the pipes, which in Harris's is very peculiar.

(1) A 435·0, EC 517·3 [MC 520·4, JC 522·0], S 2·80. (Nüke.) 1826, Germany, Saxony, Dresden, Opera. Tuning fork of Kapellmeister Reissiger, successor to C. M. von Weber. Nüke considers this to have been the Dresden pitch from 1825 to 1830.

(2) A 435·0. (Cagnard de la Tour, from de la Fage.) 1829, Paris; Italian Opéra.

(3) A 435. (Ellis.) 1849 *a*, London; old fork long in possession of a gentleman in Ireland, marked "Philharmonic;" date conjectural, evidently of Sir George Smart's time (see A 433·2). The fork was very bad, and did not beat uniformly for four seconds, so that the pitch was only approximately determined by a unison.

(4) A 435. (Fr. Com.) 1859, Carlsruhe Opera. M. Jos. Strauss, Kapellmeister at Carlsruhe, informed the French Commission that this pitch fatigued his singers, both male and female, the least, and is best adapted for the execution of operas, both ancient and modern. The French Commission was often taunted with adopting as its pitch that of a tuning fork which the Carlsruhe Kapellmeister pulled out of his pocket; but reference to the pitches in this table, from A 433 to A 436, of about 1830 and earlier, will shew that A 435 or thereabouts, was a pitch very much used 30 years and more before the French Commission was appointed.

(5) A 435·0. (Nüke.) 1862, Austria, Vienna Opera; from an oboe of Prof. Sellner in Vienna. (See Delezenne's remarks under (2) A 418.)

(6) A 435·0. (Ellis.) 1860, Paris, Koenig's Diapason Normal; from copy in possession of Dr. Stone. This is what the diapason normal was intended to be.

(7) A 435·0. (Ellis.) 1877, Paris; copy of the Diapason Normal by Secretan, in the possession of Dr. W. H. Stone.

(8) A 435·0 (Ellis.) 1877, Paris; copy of Diapason Normal, Modèle d'Orchestre, by Secretan, in my possession; actual measure, A 434·97.

A 435·2. EC 517·5 [MC 520·6, JC 522·2], S 2·82. (Scheibler's "Tonmesser," p. 53. No. 3, given as A 434·95 at 69° Fahr., here corrected to 59° Fahr.) 1834 *a*, Paris, Conservatoire, Concerts and Italian Opera; fork made by Gand, luthier du Conservatoire, Rue Croix des Petits Champs, which Scheibler trusted because he knew the maker to be skilful.

(1) A 435·3, EC 517·6 [MC 520·7, JC 522·3], S 2·82. (Older fork given as A 435·05 at 69° Fahr. Scheibler, "Tonmesser," p. 53, and here corrected to 59° Fahr.). 1834 *a*, Paris Conservatoire; an oldish fork to Scheibler, in 1834, and not trusted as much as Gand's A 435·2, from which it does not differ perceptibly. Cited by de la Fage as *Violons Gand*, 1834, as if from Scheibler, who says nothing of the kind.

(2) A 435·3. (Ellis.) 1859, Paris; copy of the Diapason Normal made by Secretan, and presented by the French Commission officially to Messrs. J. Broadwood and Sons, lent for measurement by Mr. Hipkins. (See A 435·4.) This was the fork which I used as a standard of French pitch in my former paper.

A 435·4, EC 517·8 [MC 520·9, JC 522·5], S 2·82. (Ellis.) Paris, 1859; the French Diapason Normal as actually constructed for the French Commission by Secretan, and now (1880) existing in the Museum of the Conservatoire at Paris. It was constructed under the direction of Lissajous, and its pitch was determined by the Siren, as driven by Cavaillé-Coll's bellows of constant pressure. The actual pitch has been arrived at thus: M. Cavaillé-Coll measured the Diapason Normal by his copies of Scheibler's forks, of which the first was probably in unison with a fork which he tuned for me to represent V 440, but was really V 439·59. Now, he made the diapason normal V 4·125 flatter than this; result, A 435·465. He may, however, have made it ·875 vib. above a fork of nominally V 435, which he sent me, and which was really 434·44 vib. This gives A 435·315 for the diapason normal. In the summer of 1878 my son took beats between the diapason normal and four other forks since measured, and the mean of 30 observations gave A 435·53. In the same year Mr. Hipkins found the diapason normal make 4·1 beats with a fork measured as V 439·5; this gives A 435·4, and is the mean of the other three. The following copies of the diapason normal were made by Secretan:—

	Measures.
For Berlin, sent to the Society of Arts in 1869 ...	435·5
Bought in Paris by Society of Arts	435·5
For French Commission, 1859, and given to Broadwoods	435·3
For French Exhibition, 1867, and given to Broadwoods	435·5
For Baden (dukedom), evidently too flat	434·49
For A. J. Ellis, "Modèle d'Orchestre"	434·97
For A. J. Ellis, a second copy, larger, and made with more care	435·79
In possession of Dr. W. H. Stone	434·95
Mean of 7 of these 8 forks (excluding Baden) ...	435·36
A (poor) Munich fork, stamped as correct at the Royal Office, and sent to the Society of Arts in 1869	435·06
A (fine) Russian fork made at St. Petersburg, and sent to the Society of Arts in 1869	435·74
Fork made by Koenig	434·95
A copy by Goumas, obtained for Covent Garden Opera, 1880	435·49
General mean of 11 of these 12 forks (excluding Baden)	435·34

Hence there is room for hesitation between 435·3 and 435·5, and I assume their mean, A 435·4, as due to Mr. Hipkins, armed with an excellent fork made by Kammen, and to the probable observations of M. Cavaillé-Coll. The original fork is in perfect condition, gilt but not burnished, 4⅛ in. from bend to extremity of prong, parallel prongs, mounted on resonance box, but inverted with the box uppermost, and the stem fastened to the top cross bar of a lyre, the strings of which are imitated by the prongs, furnished with two hammers with keys, one to strike and the other to damp, the whole under a glass case; the sound is very powerful. It has the maker's name, "Secretan," on one side, and on a brass plate on the stand is "Diapason Normal, 870 vibrations par seconde à la température de 15°." A second brass plate below has, "Arrêté Ministériel, en date du 16 Février, 1859. S. E. Monsieur Achille Fould, Ministre d'état." Thus preserved, it is the only authentic standard of pitch in the world, and like other standards, as those of length and weight, must be taken for what it is, not for what it was intended to be. The excellent forks of Koenig's are private

property, and may in various ways become injured (one I know has been so injured), but this standard is public property, is well guarded from injury, is perfectly accessible, and no other country has anything similar. It is, therefore, an international standard.

(1) A 435·5. EC 517·9 [MC 521·0, JC 522·6], S 2·82. (Ellis.) 1869. Berlin Opera. Copy of the Diapason Normal, made by Secretan, and sent officially to the Society of Arts to represent the pitch then used; lent for measurement. (See A 435·4.)

(2) A 435·5. (Ellis.) 1867, Paris. Copy of the Diapason Normal, made by Secretan, and presented officially to Messrs. J. Broadwood and Sons by the Commissioners of the French Great Exhibition of 1867 (See A 435·4.)

(3) A 435·5. (Ellis.) 1869, Paris. Copy of the diapason normal, made by Secretan, and purchased by the Society of Arts; lent for measurement. (See A 435·4.)

(4) A 435·5. (Ellis) 1880. Copy by P. Goumas and Cie., of the French Normal obtained by the Covent-garden Opera in January, 1880, in order to reduce the orchestra to French pitch for the approaching season. The fork could scarcely ever be counted for more than 4 sec.

MA 435·6 [JA 434·2, EA 438·2], C 521·0, S 2·82; pressure, 3 in. (Ellis.) 1830 *c*, England; Arundel Parish Church. The date is conjectural, corresponding to the pitch, which may have been raised between 1820 and 1850. Measured from a pipe at Messrs. Walker's.

A 435·7, EC 518·2 [MC 521·2, JC 522·8], S 2·83. (Ellis.) 1869, Russia: St. Petersburgh. Russian copy of the Diapason Normal, sent officially to the Society of Arts, to represent the pitch then used in St. Petersburgh. A fine large fork. (See A 435·4.)

(1) A 435·8, EC 518·2 [MC 521·3, JC 522·9], S 2·83. (Drouet, from de la Fage.) 1830, Paris, opera. This is probably only another measurement of the A 434 of Cagnard de la Tour.

(2) A 435·8. (Ellis.) 1878, Paris. Large copy of the Diapason Normal, made for me by Secretan, who was charged to correct it by the original. It has been subsequently tuned correctly by myself. (See A 435·4.)

(1.) A 436·0. MC 521·6 [JC 523·2, EC 521·6] S 2·84. (Sarti, maître de Chapelle to the Emperor; paper sent in 12th of May, 1796, in "Nova Acta Acad. Sci. Petr.," tom. xiii., 102, p. 30.) 8th of October, 1802, St. Petersburgh, opera. Successful experiments were made before the academy this day, with the two five-foot organ pipes (the Russian foot is the same as the English), with separate bellows and stops, a monochord and seconds pendulum. The pitch of the pipes could be altered by a small slit near the top, which could be wholly or partially closed by a slide. It was found, by help of the monochord, that when the beats of the pipes were one in a second, the pitch of the pipes was as 100 to 99, and hence as the difference was 1, the pitches of the pipes themselves were 100 and 99. When comparing these tones again with the 2 A of a violin in the St. Petersburgh band, also by means of the monochord, the 2 A was found to be A 436. Now, here we have at least three unisons to determine with the monochord and several lengths to measure. It is therefore impossible that the result should be accurate. An organ pipe five Russian (English) feet long, and four inches in diameter will produce V 100·4, according to Cavaillé-Coll's rule, Art. 8, note 5, p. 296. Chladni speaks of this pitch as being very high. ("Akustik," p. 34).

(2) EA 436·0 [MA 433·5, JA 432·1], C 518·52, S 2·84, (Ellis.) 1846 *p*, London. Copy, belonging to Mr. Hipkins, of an old fork bought by Mr. E. Greaves, tuning-fork maker of Sheffield, at the shop of Bates, the organ-builder of Ludgate-hill, and marked "Philharmonic." It has not since been retuned, and it now forms Mr. Hipkins's vocal pitch. As Broadwood's have used equal temperament since 1846, this is here entered under EA 436, but, when bought, it belonged clearly to mean temperament, being evidently a commercial copy of C 518, see MA 433, and A 433·2, and hence it is also entered under MA 433·5, as it belonged to mean temperament before 1846, and to equal temperament afterwards. It was the Philharmonic Pitch with which Mr. Hopkins compared the organs of Lübeck, Hamburg, and Strasburg ("The Organ," Chap. 38, ed. 1870), as I have ascertained by measuring his fork. Bates, the organ-builder, lived near the spot where the railway crosses the bottom of Ludgate-hill.

(3) EA 436·0 [JA 432·1, MA 433·4] C 518·5, S 2·84. (Ellis.) London, 1878. Messrs. Bishop's standard for church organs, taken from Metzler's fork, representing the EC to French Diapason Normal, see A 435·4.

(1) A 436·1, EC 518·6 [MC 521·7, JC 523·3] S 2·85. (Ellis.) 1869, Munich. Copy of the Diapason Normal made and stamped at the Government Office at Munich, sent officially to the Society of Arts to represent the pitch then used, see A 435·4.

(2) A 436·1, EC 518·6 [MC 521·7, JC 523·3] S 2·85. (Ellis.) 1878, London. Fork, in the possession of Messrs. Bryceson, to which they tuned the organ at Her Majesty's Theatre, Italian Opera. Meant for French pitch, when the pitch was lower a few years ago. See (2) A 445·5, and (2) A 444·9.

A 436·5, EC 519·1 [MC 532·2, JC 523·8], S 2·86. (Scheibler, "Tonmesser," p. 53, No. II. given as A 436·33 at 69° Fah., here corrected to 59° Fahr.) 1834 *c*, Vienna Opera. Fork belonging to Scheibler or his friends.

MA 436·6 [JA 433·9, EA 438·4], MC 522·3 [JC 520·5, EC 521·3], 4 G 195·26, S 2·87. (Ellis.) 1790 *c*, Padua. This was a copy made for me under direction of Prof. Rossetti from Stratico's fork (Zantedeschi's No. 2) at Padua (see A 425·2 and A 483·7, for references), and was inscribed *ol* for *sol*. Zantedeschi supposes that it was originally V 192, and that it had become about V 200, which he considers to represent an increase of about a semitone. But a semitone higher than V 192 is about V 203·5. The real difference between this G 195·3 and the high 1 G 865·1 (of A 483·7), or when reduced to the same octave G 390·53 and G 432·56 is S 1·77, not quite a tone. It is uncertain whether this fork was taken from an actually used pitch, but it clearly may have been.

A 436·7, EC 519·3 [MC 522·4, JC 524·04], S 2·87 (Delezenne.) 1845, Florence, opera. (?) Fork obtained and lent to M. Delezenne by M. Marloye.

MA 436·8 [JA 435·4, EA 439·4], C 522·5, S 2·87. (Ellis.) 1740-80. Green's Organ in the refectory of Trinity College, Dublin. But as Green's usual pitch was C 505·6, see (1) A 422·6, this was probably sharpened about Sir G. Smart's time, see A 433·2. It has not been sharpened by Telford, who has had charge of it since 1843, and says that it could only have been sharpened by Ferdinand Weber.

A 436·9, EC 519·6 [MC 522·7, JC 524·3], S 2·88. (Ellis.) 1869, Würtemberg. Fork sent officially from Stuttgardt to the Society of Arts, as representing "the pitch usually adopted" in Würtemberg. It was stated at the same time that "there is no officially prescribed pitch in that country, although the new French is commonly in use;" so that this may be, after all, an imperfect copy of the French Diapason Normal. (See A 435·4.)

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6. *Modern Orchestral Pitch, and Church Pitch, Medium, marked* (°).

(1) A 437·0. EC 519·7 [MC 522·8, JC 524·4] S 2·88. (Cagnard de la Tour, from de la Fage.) 1836, Paris Italian Opera.

(2) A 437·0. (Fr. Com.) 1859, France, Toulouse; Conservatoire, See the Theatre, A 442·5, which is about a comma higher; the Fr. Com. says a quarter of a tone, and considers the difference remarkable, because Toulouse is a very musical place, with good singers. It also states that young singers here trained often found much difficulty, and even suffered a perceptible deterioration of voice, on exchanging their low pitch for the high pitch of Paris, then A 445·8 to A 446·2.

°(1) MA 437·1 [JA the same, EA 440·6], MC 522·9 [JC 524·6, EC 524·58], 2 F 349·72, S 2·89. (Ellis.) England, 1666; Worcester Cathedral Organ, built by Thomas and Renatus Harris. This pitch is rather uncertain. It was measured from an original show-pipe belonging to Messrs. Hill and Sons, who rebuilt the old organ in 1842. Being a show-pipe, it was much too long, and holes had been cut behind to bring it to pitch. This part of the pipe had been broken off, and the pipe in this state measured V 361 at 57° F, or V 36 at 59° F, giving MA 452·5, which would have been exceedingly sharp. To imitate the shading effect of the piece cut off, which Mr. Hill's voicer estimated would reduce the pitch by ¾ of a tone, a roll of paper was put on at the end, nearly two parts round, and then the result was as above. But very probably the pitch was thus lowered too much, and it is much more likely that the pitch was B. Schmidt's (see A 441·7.) If we suppose this to be the case, and that Thomas Harris, sen., who built the organ of Magdalene College, Oxford, used the same pitch, then R. Harris's proposal to reduce this last organ by "half a note" (see Rimbault's "Hist. Org." ed. 1870, p. 120) would mean to reduce it from a B *flat* foot organ to a B foot organ, which was R. Harris's own pitch (see A 427·7.) It would also show that B *flat* foot organs existed in England before B. Schmidt's time. It is very probable, however, that this may have been an A foot organ, see A 474·1, but then the pipes must have been shifted. The Magdalene organ may have also been A 474·1, and then R. Harris's proposal would have been to shift the pipes and make it A 441·7. The pitch of Messrs. Hill's organ at Worcester Cathedral, in 1878, according to Mr. Done, the organist, as communicated to Mr. Hipkins, was C 532 at 66° Fahr., that is, at 59 Fahr., C 528·13, EA 444·1.

(2) A 437·1. (Delezenne.) Lille, 1841. Organ of St. Etienne, which had been completely rebuilt in this year, and hence this was probably the pitch of the period.

(1) A 437·2, MC 523·0 [JC 524·6, EC 519·9], S 2·89. (Ellis.) London. Old fork, formerly belonging to the late Prof. Faraday, lent by Mr. Blaikley, of Messrs. Boosey. This seems to have been merely a music-shop fork. There was no second fork tuned in accordance with it.

(2) A 437·2. (Ellis.) London. Old fork, stamped A Philharmonic, but rather sharp for its apparent date.

A 437·3, EC 520·1 [MC 523·1, JC 524·6], 4 A 218·65, S 2·89. (Fischer, Abhandl. Akad. Wiss., Berlin, 1822 and 3, p. 206) 1822, Berlin; from a fork furnished by Kammermusikus Pichler, who tuned the piano for the great theatre. A vertical wire, stretched by a constant weight, was limited by a bridge till it sounded in unison with a certain fork. Of course, the stretching weight should be increased by the length of the string below the limiting bridge and the constant weight; but this was not regarded. This neglect is one element of uncertainty. The thickness of the wire necessary to support 480 Prussian Loth = 247·46 English ounces, is another source of error. Delezenne thinks that all Fischer's determinations may be V 5 too flat from this cause alone (see (1) A 431·7, (2) 424·2, and 427·6). The string sounded only three or four seconds, so that the unison was very difficult to seize, experiments had to be made at night, and much practice was required. By

dint of great care, the difference between the least and greatest lengths was reduced, under favourable circumstances, to ·03, and unfavourable, to 0·5, Prussian or English inch. The value in the present case was the mean of 30 trials. Fischer, however, reckons that he cannot be more than one simple vibration wrong in any case, and, in this case, not more than 0·1 vibration. In Fischer's memoirs there are curious misprints. His constant $= \frac{1}{2}$ (log 375 + log 50 + log 480 — log ·0889) $= \frac{1}{2} \times 8{\cdot}0053407$, and he has accidentally only divided the characteristic, and printed 4·0053407 in place of 4·0026703; but the calculations are made from the correct value. See the formula p. 298, note 6. The present pitch is high, and I have reckoned equal temperament, as that was used early in the North of Germany (see A 489·2).

(1) A **437·4**, EC 520·2 [MC 523·3, JC 524·9], S 2·89. (Delezenne.) 1854*a*, Paris; opera. Four forks, purchased before 1854, by Delezenne, and found in unison; a fifth fork, not in unison, was rejected. There is no other authority for this pitch.

(2) A **437·4**. Maidstone. See Appendix No. 8.

A **437·5**, EC 520·3 [MC 523·4, JC 525·0], S 2·90. (Nacke) 1823, Vienna. Performance of Weber's Euryanthe.

*EA **437·7** [MA 435·1, JA 433·8], C 520·5, S 2·91. (Ellis.) England; Great Yarmouth Parish Church, built by Byfield, Jordan, and Bridge (see MA 425·9), after it had been equally tempered by Messrs. Hill and Son, and "trimmed." Probably the old C was C 509·5, and it was certainly then in meantone temperament. From a fork sent me by the organist, Mr. Henry Stonex, which was said to beat with the organ so slowly that the beats could not be counted. This organ never had any quarter tones.

A **437·8**, EC 521·8 [MC 523·1, JC 525·4], S 2·91. (Ellis). 1862, Dresden. Fork given by the Direction of the Court Theatre to its librarian, Herr Moritz Fürstenau, to represent the pitch after the Conference and Experiments of Pitch held at the theatre (see Art 28, p. 313), and kindly sent to me for measurement. Meant for A 440. (See (2) A 438·9 and (3) A 439·4.) This is a good specimen of varieties of forks meant to have the same pitch.

(1) A **438·0**, EC 520·9 [MC 524, JC 525·6], S 2·92. (Cagnard de la Tour from de la Fage.) 1829, Paris; Opéra Comique.

*(2) A **438·0**. (Stone.) 1877, Westminster-abbey. Observed by Dr. W. H. Stone with a König's V 435, in the Abbey, in May; temperature unknown. (See (2) A 422·5.)

EA **438·2** [MA 441·7, JA the same, if we assume it to be a major Third below the C *sharp* measured], EC 521·2 [MC 528·4, JC 530, if we take it a just minor Third above the JA just determined], 2 C *sharp* 276·07, S 2·93. (De Prony, "Méc Anal.," Part II, p. 495.) 1815, Paris. An iron wire, 0·5825 metres long, weighing 0·615 grammes, and stretched by a weight of 11134 grammes, was in unison with C *sharp*, but of what pitch is not said. Perhaps this C *sharp* and the F of EA 444·5, which see, were only those on De Prony's own pianoforte. The pitch given agrees with that calculated by the common formula (see p. 298, note 6).

MA **438·5** (JA 437·1; EA 441·1), C 524·5, S 2·94. (Cavaillé-Coll). 1800*c*, England. Fork of English make, formerly belonging to M. Aristide Cavaillé-Coll's father, communicated by M. Cavaillé-Coll.

*(1) MA **438·9** [EA 436·3], MC 525·2 [EC 518·8], 2 F *sharp* 366·9, S 2·95. (Ellis.) England; Boston Organ, Lincolnshire. Attributed to Christian Smith, 1696. The pipe was a flute stop, and very uncertain. There was, also, a 2 A, much cut, giving A 458·4, which could not fit into the above, and is extremely sharp, belonging to the A 454·2 series; so that there is, probably, some mistake. As measured from F *sharp*, the organ approaches to the low pitch of B. Schmidt, of whom Chr. Smith was a nephew. Both pipes belong to Messrs. Hill and Son, who repaired the organ.

(2) A **438·9** EC 522·0 [MC 525·1, JC 527·3], S 2·95. (Ellis.) 1869, Dresden Theatre. Fork sent officially from Leipzig to the Society of Arts, and lent for measurement. (See also A 437·8, 439·1, and 440·4.)

*MA **439·0** [JA 437·5, EA 441·5], C 525, S 2·95. (Ellis.) London; St. Mary's Chapel, Paddington, next the Lying-in Hospital, date and maker unknown. The organ was repaired by Messrs. Bevington, and the 2 C 262·5 was measured direct; also another C 526·3, a fifteenth of the mounted cornet, great organ; a stop which has long gone out. I have taken the pitch from the larger pipe.

(1) MA **439·4** MC and JC 525·6 [EC 521·5], 4 E 164·25, S 2·97 (Delezenne.) No date, Lille. Old fork, purchased at the sale of the Marquis d'Aligre; prongs, 174 mm. long. From its value, 4 E 164·25, Delezenne first derived 4 JC 131·4; and then, taking three just Fifths up, reached 2 A 443·48, which he regarded as the pitch. But this would only do on the open strings of a tenor violin. The organs used the flatter Fifths of the meantone temperament. Hence I have derived the MA, MC, JC, and EC immediately from the pitch of E.

(2) A **439·4**, EC 522·5 (MC 525·6, JC 527·2], S 2·98. (Scheibler's "Tonmesser," p. 53, No. III.; given as A 439·15 at 69° Fahr., here corrected to 59° Fahr.) 1834*c*, Vienna; Opera. Fork belonging to Scheibler or his friends.

(3) A **439·4**, EC 522·6 [MC 525·6, JC 527·3], S 2·97. (Ellis.) 1878, Dresden Opera. Fork prepared for me by the Court organ-builder Jehmlich, and sent to me by Herr Moritz Fürstenau, librarian of the theatre. (See also (2) A 438·9, A 437·8.)

(1) A **439·5**, MC 525·7 [JC 527·3, EC 522·6], S 2·98. (McLeod and Ellis) 1812, France; Paris Conservatoire. Copy of a fork (compared with the original, which is not in good condition, by M. Cavaillé-Coll, who pronounced it "sufficiently correct") preserved in the Musée du Conservatoire (No. 492 of catalogue), and purporting to be that used in 1812 at the Conservatoire. (Compare A 440·9, and A 435·2.) The catalogue says that it is the fifth of a tone flatter than the diapason normal; it is, actually, S 0·16 sharper. Length of the original, from bend to prong, 3¾ in. converging prongs, conical brass cup at bottom of stem. The top is crushed, as if from being held in a vice. The fork is a very poor one, and its sound is scarcely audible for 10 sec.; but, as compared by my son, it also gave A 439·5.

*(2) EA **439 5** [MA 436·9, JA 436·5], C 522·7, S 2·98. (Ellis.) 1855; Organ of Parish Church, Barking, Essex. The original organ was built by Byfield and Green, 1770; but the pipes were shifted a Tone, and cut and equally tempered, by Walker in 1855. It was, therefore, probably an A foot organ originally, for A 474·1 gives B *flat* 507·3, which is just a quarter of a Tone flatter than C 522·7, and hence could be easily cut down to it, and the markings on the pipes show that old B *flat* was made into new C.

A **439·9**, EC 523·2 [MC 526·3, JC 527·9], S 2·99. (Delezenne.) Turin, 1845. Fork obtained and lent to M. Delezenne by M. Marloye.

(1) A **440·0**, EC 523·25 [MC 526·36, JC 528], S 3·00 (Lissajous, cited by de la Fage.) Paris, 1829. Orchestra pitch of opera (see (1) A 425·8). Fork verified by M. Monneron for A. de la Fage.

(2) A **440·0**. (Wieprecht, cited by Fr. Com.) 1830, Berlin opera. Original statement by Wieprecht not found.

*(3) EA **440·0** [MA 437·4, JA 436], C 523·2, S 3·00. (Ellis.) 1878, London. Messrs. Gray and Davison's standard pipe for organs. They told me they had lowered their pitch lately.

(1) A **440·2**, EC 523·5 [MC 526·6, JC 528·3], S 3·01. (Scheibler measured this as A 440 by his own forks, which were adapted for 69° Fahr.; hence, correcting to 59° Fahr., we have the above.) 1834, Stuttgart; Congress of Physicists, who accepted Scheibler's proposal, which Scheibler says ("Tonmesser," p. 53), was selected as the mean of the variation of Vienna grand pianos by temperature. de la Fage says that this very fork was measured by Lissajous in 1856, at the request of M. Bodin, and found to be A 440·3. The French measures are intended for 59° F., = 15° C. Hence the difference would be only V 0 1; and, if Lissajous really measured at 55° Fahr., the agreement would be complete. But, as the great Diapason Normal is A 435·4, in place of A 435, there is no reason to suppose that the measure was made with such extreme accuracy. Whether this standard fork exists still, and where, or how it is preserved, I do not know.

*(2) EA **440·2** [MA 437·7, JA 436·3], C 523·6, S 3·01, pressure, 3 in. (Ellis.) 1879, London; Messrs. Walkers' standard pipe.

A **440 3**, EC 523·6 [MC 5 6·7, JC 528·4], S 3·01. (Scheibler's "Tonmesser," p. 53. No. IV. given as A 440·1 at 69° Fahr, and here corrected to 59° Fahr.) 1834*c*, Vienna Opera. Fork belonging to Scheibler or his friends.

MA **440·4** [JA 439·0, EA 492·9], C 526·8, 2 C 263·4, S 3·01. (Ellis.) London, date unknown. Old fork, found by Messrs. Bishop in an old amateur organ at Westminster. It was a large fork, giving the 2 C.

(1) A **440·5**, EC 523·8 [MC 526·9, JC 528·6], S 3·02. (Delezenne.) 1854*a*, Paris Opera. Fork said to have been adjusted to this pitch by M. Fétyel, date unknown.

*(2) A **440 5**. (Delezenne.) 1854, Lille. Organ of St. Catherine, repaired, and evidently re-tuned to concert pitch.

*(3) EA **440 5** [MA 437·9, JA 436·5] C 523·7, S 3·02. (Ellis.) 1878; Messrs. Bevington's standard pipe. But Messrs. Bevington said that they have since raised their pitch 2 to 4 beats; hence, possibly, they use about E A 444, C 528.

A **440 9**, EC 524·3 [MC 527·5, JC 529·1], S 3·03. (Scheibler's "Tonmesser," p. 53, No. 4, where it is given as A 440·7, at 69° Fahr., and is here reduced to 59° Fahr.). 1834*c*. Paris. Conservatoire Concerts and Italian Opera (cited by M. Cavaillé-Coll as Scheibler's pitch of Grand Opera in 1834). This was not rusted by Scheibler's so much as A 435·2.

(1) A **441·0**, EC 524·5 [MC 527·6, JC 529·2], S 3·04. (Delezenne.) 1836-39, Paris Opera. Fork of M. Leibner, whose duty it was to keep the pianos of the opera to the pitch of the orchestra, for rehearsals. Verified by Meyerbeer at the rehearsal of the "Huguenots." In 1849 it agreed precisely with the oboe of M. Verroust, which gave the pitch at performance.

(2) A **441·0**. (Cagnard de la Tour, from de la Fage and Cavaillé-Coll). Paris, 1836; Opera Comique.

(3) A **441·0**. (Fr. Com.), 1859, Dresden Opera. Fork apparently sent by Kapellmeister Reissiger, who wrote, "The great elevation of the diapason destroys and effaces the effect and character of ancient music—of the master-pieces of Mozart, Gluck, and Beethoven." Reissiger's own fork was (1) A 435. The Dresden pitch was intentionally A 440. (See A 438·9, see, also, the proceedings of the Dresden Conference, Art. 28, p. 313.)

(4) E A **441·0** [M A 438·3, J A 437], C 524·4, S 3·04. (Ellis.) 1879, London. Church organ pitch of Messrs. Lewis, of Brixton, from a fork lent me by these well-known organ-builders.

A **441·1**, EC 524·5 [MC 527·7, JC 529·3], S 3·04. (Scheibler's "Tonmesser," p. 53. No. V., where it is given as A 440·87 at 69° Fahr., and is here reduced to 59° Fahr.) 1834. Vienna opera. Fork given by Pro. Blahetka to Scheibler as a trustworthy A of the Vienna orchestra. Cited as A 440·7 by Delezenne, who confused

it with the Berlin fork, A 441·8; de la Fage apparently cites this as both A 440·37 and A 440·33. This fork was found in a lumber room in Scheibler's former dwelling in 1879, and was lent to me for examination. It had the words, "Professor Blahetka, Wiener Orchestra," written on the inside of the prongs. It had, apparently, been slightly wrenched, and could not well be counted for 6 secs.; it was also exceedingly rusty. Its present pitch, so far as I could ascertain, is A 439·9, so that it has lost V 1·2, owing to ill-treatment. This is the largest loss in any tuning fork I have yet been able to ascertain (see p. 297, and A 441·8, (1) A 443·2).

A 441·2, EC 524·7 [MC 527·8, JC 529·4], S 3·05. (Ellis.) 1878, London, Covent-garden. Fork then in possession of Messrs. Bryceson (since retuned), giving the pitch to which the organ at Covent-garden Opera was tuned in 1878. In 1879 it was raised to A 445·6, which see, while in the theatre itself Mr. Hipkins observed it by beats with his own fork as A 449·7, which see. Mr. Hipkins also recorded the pitch of the harmonium at Covent-garden, June, 1877, as A 449·2, and in July, 1878, as A 447·5, while the orchestra at this last date was (2) A 449·9. See these numbers. The heat of the theatre sharpens the organ, so that when, in 1879, Mr. Pitman, the organist, adopted the plan of keeping the A of the organ going for half an hour for the band to tune by, the pitch rose. In 1880, the pitch is to be reduced to the French A 435·4.

EA 441·3 [MA 438·8, JA 437·3], C 524·8, S 3·05. (Ellis.) 1842, London. Fork bought about 1842, when Mr. Hullah was giving lessons in singing on Wilhem's method, and issued by his authority, stamped, "Do. 512, vib. per sec. C. J. W. Parker, West Strand." Another copy issued at the same time, and bought by Mr. de Pontigny, measured C 525·06, or within 0·2 vib. of the same pitch. The error was therefore not the fork maker's. In his report to the Society of Arts on Uniform Musical Pitch, 3rd June, 1859, Mr. Hullah says that the original of this fork was tuned by the siren, and that it had been largely used, and that several important organs had been tuned to it, and also states in a note that Mr. J. H. Griesbach had measured the fork by his process, and found it C 521·6. This statement shows the untrustworthiness of both methods. A particular point had been made of reaching C 512, and C 524·8 resulted, being S ·43 too sharp, that is very nearly a quarter of a tone, and not, as Mr. Hullah says, a quarter of a semitone.

• (1) MA **441·7** [JA 441·0, EA 446·1], MC 528·4 [JC 531·7, EC 530·5], B *flat*, 472·6, S 3·07. (Ellis.) 1690, Hampton-court. Bernhardt Schmidt's Organ. Firstly, a B *flat* pipe (12 in. long and 1·2 in. in diameter), belonging to this organ before it was altered by Messrs. Hill and Sons, and in possession of Messrs. Broadwood, was measured as 470·9, at first; but after the mouth had been cleaned at 472·9 and 472·3, mean 472·6, here adopted, all reduced to 59°F. Messrs. Hill informed me that they had not altered the pitch of C when repairing the organ. Secondly, on 15th August, 1878, I measured the pitch of C of the Choir Organ at Hampton-court Palace as C 528·7. (See MA 442.) Thirdly, on 14th October, 1878, I measured at Messrs. Hill and Sons' a perfectly untouched 1 A from the old Echo Organ at Hampton-court. I had to tune a pipe to the Octave below, as my measuring forks did not reach so high, and this gave me A 441·25 at 59° Fahr., whence MC 527·9. Fourthly, Dr. Robert Smith ("Harmonics" 1859, p. 192) measured his Trinity College Organ D, which was B. Schmidt's original C (for the pipes had been shifted), in September, "at temperate or thereabouts," as V 524; in November, when "cold," as V 508; and in August, when "pretty hot," as V 536. If we assume "pretty hot" to mean 72° Fahr., "temperate or thereabouts" to be 59½°, and "cold" to be 21° Fahr., which is possible, then the numbers of these three temperatures gives the original C as 528·8, 528·6, and 528·1 respectively, which agrees remarkably well with the above MC 528·4. Dr. R. Smith's method of measuring by a weighted string was perhaps not safe within 4 or 5 vib., and the method of reduction of temperature is also not perfectly safe. From these measurements, there can be little doubt that this was one of Bernhardt Schmidt's pitches. (Mr. T. Hill is positive that there is no trace of the pipes ever having been shifted.) But it also seems to be certain that he used a sharper pitch at St. James's Chapel Royal, and Durham Cathedral. (See A 474·1.) What he used at St. Paul's cannot be inferred with certainty. (See A 444·6.) The Temple organ is also doubtful. All these organs seem certainly to have had A 441·7 at one time, and both the Temple and St. Paul's were flattened by Bishop. (See end of remarks on (1) A 422·5.)

• (2) MA **441·7**. (Hill.) 1814*p*, London; Whitehall, Banqueting-room. Mr. T. Hill says that this organ was sharp, and of the same pitch as Hampton-court before he altered it; but it had been altered by Elliott in 1814. It is possible, however, that it was originally as sharp as the original Durham organ (see A 474·1), before Mr. Hill had to deal with it. It was the first organ built by Bernhardt Schmidt in England. Indeed, it is said that Charles II. sent for him on purpose to build it. It was always in the banquetting-room; so that it escaped the flames when the chapel was burned, and George I. afterwards opened the banquetting-room as the Chapel Royal. Purcell was organist there.

(3) **A 441·7**, EC 525·3 [MC 528·4, JC 530·0], S 3·07. (De Prony' from de la Fage.) Paris, 1832. Proposed as a standard by De Prony, according to A. de la Fage. It will be observed that the EC and JC here are different from what they are in (1) MA 441·7. The reason is that here they are taken from an original A, and there from an original B *flat*.

• (4) EA **441·7** [MA 439·1, JA 437·8], C 525·3, S 3·07, pressure 2¾ inches. (Ellis.) London, Aug. 1878, Standard pipe of Messrs Hill and Sons, organ-builders. Here again the numbers are different from (1) MA 441·7, because they are calculated from an original C.

A 441·8, EC 525·4 [MC 528·6, JC 530·2], S 3·07. (Scheibler, "Tonmesser," p. 53, given as A 441·625, here reduced to 59° Fahr.) 1834 *c*, Berlin; Opera. Considered by Scheibler a trustworthy fork of the Berlin Orchestra; but he was certain that Berlin forks varied V 1·5 to V 2, and thought this sufficient to make a part possible or impossible to a singer. M. Cavaillé-Coll, who cites this, also cites A 441·025 as a pitch of the Vienna opera measured by Scheibler, but I do not find it in his book. This fork was found at the same time and place as A 441·1; it has been a good fork, and can easily be counted for 10 seconds, but it is very rusty. It now measures A 440·9. Hence it has lost V 0·9. The other fork had lost V 1·2. The beats between the forks in Scheibler's time were 0·76 per second. They were now, by the measurements, 1·07, and by observation 1·0, which was difficult to observe with accuracy on account of the badness of the other fork. Hence the beats between them have increased ·24 to ·3. This is accounted for by the difference of their loss, 1·2 — ·9 = ·3. This loss by rust is considerable. Large forks do not seem to suffer so much. Scheibler's V 219, found at the same time, is now V 218·77, and hence has lost ·23 by rust. (See (1) A 443·2 below, and Art. 10, p. 297.)

• (1) MA **442·0** [JA 440·6, EA 444·6], C 528·7, S 3·08. (Ellis.) London, 1690. B. Schmidt's Organ, at Hampton-court, measured from the unaltered C of the choir organ (see MA 441·7). Messrs. Hill had altered the temperament to equal, and I measured their EA 445, which agrees closely with the above. All at 59° Fahr.

(1) **A 442·5**, EC 526·2 [MC 529·3, JC 532·0], S 3·10. (Delezenne.) 1854, Paris; Italian Opera. As determined by reeds giving that pitch, for which there is no other authority.

(2) **A 442·5**. (Fr. Com.) 1859, France; Toulouse, Opera. (See (2) A 437·0.) Fork sent by M. Mériel, Director of the School of Music at Toulouse.

(3) **A 442·5**. (Fr. Com.) 1859; Brussells, Theatre. Pitch recommended and used by M. Bender, Musical Director to the King of the Belgians, a quarter of a tone flatter than his military pitch, A 455·5, which see.

• **A 442·7**, EC 526·5 [MC 529·6, JC 531·2], S 3·11. (Ellis.) 1878, Austria. Small Franciscan organ at Vienna, kept at modern pitch (compare St. Stefan, (2) A 443·2) for the purpose of musical services and performances ("zur Benützung bey musikalischen Aemtern oder Aufführungen"). From a fork tuned for me by Organ-builder Ullmann, who also tuned C 525·5, showing that the Organ-builder Ullmann, who also tuned C 525·5, showing that the temperament was equal, but not quite perfect. (See large organ, A 457·6.)

(1) **443·0**, EC 526·8 [MC 529·9, JC 531·6], S 3·12. (Fr. Com.) 1859; Bordeaux, Opera. Apparently the fork sent by M. Mézerai, conductor of the orchestra, who said that he first adopted the Paris pitch, A 448, but found it fatigued his singers too much. Yet the difference between that pitch and this is barely a comma.

(2) **A 443·0**. (Fr. Com.) 1859, Germany, Stuttgardt, Opera.

• (1) **A 443·1**, MC 530·1 [JC 531·7, EC 526·9], S 3·12; pressure 3 in. (Ellis.) 1815*c*, Durham; organ built by Bernhardt Schmidt, as altered by shifting. One of the original pipes, 2 B *flat*, was of exactly the same dimensions as that from Hampton-court (see A 441·7); but, as it had been pieced by Bishop, I selected the 2 A, which was unpieced. It is, however, certain that this 2 A was originally Schmidt's 2 G *sharp*, giving A 474·1, which see. The present organ, by Willis, is in his own pitch (see A 444·7).

(2) **A 443·1**, EC 527·0 [MC 530·1, JC 531·8], S 3·12. (Ellis.) 1869, Italy; Bologna, Liceo Musicale. Fork sent officially to the Society of Arts as representing the pitch used at this Liceo. Measured graphically by Sig. Lorenzo della Casa, Professor of Physics at Bologna, and the engineer Sacchetti, and by the siren by Sig. Carlo Verardi, Professor of Music there, as 443·88; apparently a mean of many attempts. Meant for A 444.

(1) **A 443·2**, EC 527·1 [MC 530·3, JC 531·9], S 3·13. (Scheibler, as cited by Delezenne, who gives A 443·0; but, if Scheibler published the numbers, they must be reduced to 59° Fahr., as above.) 1834, Vienna; Streicher. Although I cannot find this pitch in Scheibler's "Tonmesser," a fork, with diverging prongs, and very rusty, was found at the same time as the forks A 441·1 and 441·8, bearing the name "Streicher," in ink, inside one prong. The fork now measures A 442·78; hence it has, apparently, lost V 0·43 by rust, which is not excessive. (See Art. 10, p. 297.)

• (2) **A 443·2**, EC 527·1 [MC 530·2, JC 531·7], S 3·13. (Ellis.) 1878, Austria; Vienna, St. Stefan Cathedral Organ. From a fork especially tuned for me by the Organ-builder Ullmann, giving A 440·1 at 9° R. The pitch was intended to be the same as the opera (see (2) A 446·8), and the organ was tuned to the same fork. If so, there must have been an insufficient allowance for temperature. This is, however, a modern pitch, and does not at all represent the ancient pitch of this organ, which was a very old one when described by Hopkins ("Organ" ed. 1870, p. 406).

(1) **A 443·3**, EC 527·1 [MC 530·3, JC 531·9], S 3·13. (Wölfel.) 1836, Paris; Wölfel's pianos. Cavaillé-Coll, who cites this pitch, explains that Wölfel, a pianoforte-maker in Paris, made a tonometer for himself from Scheibler's description. Delezenne and de la Fage attributes the measurement to Scheibler, but I find nothing about it in Scheibler's works.

(2) **A 443·3**. (Fr. Com.) 1859, Germany, Gotha, Opera.

• EA **443·4** [MA 440·8, JA 439·4], C 527·3, S 3·13. (Ellis.) 1878, London; Messrs. Bryceson's standard pipe.

A **443·5**, EC 527·4 [MC 530·5, JC 532·2], S 3·14. (Fr. Com.) 1859, Germany, Brunswick, Opera. Fork apparently sent by Kapellmeister Franz Abt.

• (1) EA **443·7** [MA 441·0, JA 439·6], C 527·6, S 3·14; pressure, 3 in. (Ellis.) England; Salisbury, St. Edmund's; the pitch subsequently raised. From a pipe at Messrs. Walkers. Date unknown; pitch apparently modern.

• (2) EA **443·7**. (Ellis.) London, St. George's-in-the-East. From a pipe in possession of Messrs. Walkers.

EA **444·0** [MA 441·4, JA 440], C 528, S 3·16. 1860. Intended but unexecuted standard of the Society of Arts. For real standards see (1) A 449·4 and 445·7; and for copies, see (5) A 448·0, (2) 448·4 (2) 445·1. This was also proposed by M. Aristide Cavaillé-Coll in 1858 (see A 444·3).

EA **444·2** [JA 440·2, MA 441·5], C 528·2, S 3·16. (Ellis.) London. Old fork, date unknown, marked "C., Philharmonic." I cannot assign a date, but, as it does not belong to the old C 528 pitch, I put it in eq. temp.

•(1) A **444·3**, EC 528·4 [MC 531·5, JC 533·1], S 3·17. (Cavaillé-Coll, "du Ton Normal," p. 13.) 1840. France; St. Denis, cathedral organ, as re-built by M. Cavaillé-Coll, who advocates the use of A 444, EC 528 for the standard, like the Society of Arts.

•(2) **444·3**. Temple organ, altered. (See Appendix No. 9.)

(1) EA **444·5** [MA 441·0, JA the same], EC 528·5 [MC 527·5, JC 529·2], 16 F 44·098, S 3·18 (De Prony, "Méc. Anal.," Part 2, p. 495.) 1815, Paris. It was determined as the unison of a brass wire, 1·48 mètres long, weighing 12·783 millegrammes, and stretched by a weight of 15000 millegrammes. The usual formula (p. 298, note 5) gives the same result. Of course, there is considerable uncertainty. Possibly both this experiment and the former (A 438·2) referred to the same real pitch, but, if so, as they differ by V 6·3, they would serve to show the untrustworthiness of the method. De Prony uses equal temperament only, and considers that this pitch is that of the actual orchestra, which he says is about one-twelfth of an octave above the old ton d'église employed by Sauveur. He reduces this and the experiment in EA 438·2 to give C 132·29 and C 130·36 (which should be, taking equal temperament, EC 132·14 and EC 130·28). Then he reduces both by one semitone, and obtains what he supposes to be the old ecclesiastical pitches, C 124 and C 123 (which should have been C 124·7 and C 122·97); and he then compares them with Sauveur's C 122 (which should have been C 120·875, see A 406·6). The whole process is entirely erroneous. Equal temperament should not have been employed, nor can the orchestral pitch of 1815 be assumed as the ton de chambre of the ton d'église of 1713; nor, finally, does Sauveur represent his pitch as the ton d'église. The mean of these two experiments of de Prony, is EA 441·35. M. Cavaillé-Coll ("Du Ton Normal," p. 13) cites from de Prony the mean of two experiments in 1832 (instead of 1815) as A 441·915. Can they be corrections of the same?

(2) **444·5**, EC 528·6 [MC 531·74, JC 533·3], S 3·18. (Lissajous, from de la Fage). 1858, Madrid, Theatre Royal. Sent to Adrien de la Fage by D. Hilarion Eslava, Maître de Chapelle to the Queen of Spain. The ton de chapelle is said to be an equal semitone flatter. (See (1) A 419·6.) French pitch was adopted by the Spanish Government, 18th March, 1879.

• EA **444·6** [MA 442, JA 440·6], C 528·7, S 3·18. (Ellis.) 1877, London; St. Paul's Organ. Fork, in possession of Mr. Hipkins, tuned to a piano which had been tuned to St. Paul's organ for the performance of the Passion Music in March, 1877, and had been observed by the organist, Dr. Stainer, to go well with it. But this was after the organ had been adjusted and almost rebuilt by Willis to his own pitch, A 445·2, which is only V·6 sharper than the above, and hence implies that the piano was tuned to the organ at 57·5° Fahr. in place of 59° Fahr.

• A **444·7**, EC 528·9 [MC 532·0, JC 533·6], S 3·18. (Ellis.) 1879, England. Durham Cathedral organ, after it had been rebuilt by Willis to his own pitch, A 445·2, from which my measurement differs by only V 0·5, and considering that the Durham organ was measured in the organ at 44° Fahr., and Mr. Willis's standard pipe separately at 61·5° Fahr., and then both reduced to 59° Fahr., it shows a very satisfactory agreement.

(1) A **444·8** EC 528·9 [MC 532·0, JC 533·7], S 3·19 (Fr. Com.) 1859, Italy, Turin, Opera. This was apparently the fork sent to the Commission by M. Coccia, director of the Philharmonic Society at Turin, and *maestro di capella* of the Cathedral of Novára. M. Coccia says that this pitch is the mildest (*il piu mite*) that he has met with.

(2) A **444·8** (Fr. Com.) 1859, Germany, Weimar, Opera.

(3) A **444·8** (Fr. Com.) 1859, Würtemberg; concerts. Fork apparently sent by Herr Joseph Abenheim, Kapellmeister.

(1) A **444·9**, EC 529·1 [MC 532·21, JC 533·8], S 3·19. (Lissajous, from de la Fage.) Naples, 1857; San Carlo. Fork sent by Mons. E. Guillaume, conductor of the band of the Theatres Royal, Naples, to the (French) Society of Pianoforte-makers.

(2) A **444·9**. (Hipkins.) 1880, London; her Majesty's Opera. Fork of the theatre. See (2) A 436·1, and (2) A 445·5.

(1) A **445·0**, EC 529·2 [MC 532·3, JC 534], S 3·20. (Nüke.) 1862. Austria, Vienna, Pianos. The piano of Kapellmeister Proch, while the opera was at A 466, which see; and also A 454.

(2) A **445·0**. (Schmahl.) Germany, Hamburg. This was given me by Herr Schmahl (see A 494·5) as the "old Hamburg pitch," but at what date is not stated.

(1) A **445·1**, EC 529·3 [MC 532·4, JC 534·1], S 3·21 (Scheibler's "Tonmesser," p. 53, No. VI., given as 444·87, at 69° Fahr., and here reduced to 59° Fahr.). 1834 *c*, Vienna, Opera. Fork belonging to Scheibler or his friends, the highest of six of Vienna, of which he gives the measure, and he considers it to be a "monstrous growth" (*Auswuchs*). This is, apparently, the fork cited as A 445 by Delezenne (Lille Mem., 1854, p. 15), and also by Cavaillé-Coll ("Du Ton Normal," p. 13). It is cited both as A 445 and A 445·44, apparently, by de la Fage, who gives the latter number to the Vienna Conservatoire.

(2) EA **445·1** [MA 442·5, JA 441·1], C 529·3, S 3·20. (Ellis.) London, 1878. Fork sold by Cramer as Society of Arts pitch, in possession of Messrs. Bishop, organ-builders.

•EA **445·2** [MA 442·5, JA 441·2], C 529·4, S 3·20 (Ellis, at 59° Fahr.), London. Church pitch of Mr. Henry Willis, to which are tuned the present organs of St. Paul's and Durham Cathedrals (see A 444·6 and A 444·7), and also of Salisbury Cathedral, built 1878, of Glasgow Cathedral (Established Church of Scotland), and the new Episcopal Cathedral of St. Mary, Edinburgh, all recently built by Mr. Willis. This pitch was derived from a pipe tuned at 65° Fahr. to a Society of Arts fork, by an unknown maker, now mislaid. Now, the pipe giving C 529·4, at 59° Fahr., will sound C 532·7, at 65° Fahr., whence we derive EA 447·9. This makes it probable that it was one of Cramer's forks (see (2) A 448·4). It was really flatter than Griesbach's C 534·46, intended for C 528 (see (1) A 449·4). I am much indebted to Mr. Willis for much polite attention respecting his organs.

A **445·4**, EC 529·7 [MC 532·9, JC 534·5], S 3·21 (Delezenne.) Vienna, 1845; Conservatorium. Fork obtained, and lent to M. Delezenne by M. Marloye.

(1) EA **445·5** [MA 442·8, JA 441·5], C 529·7, S 3·21. (Ellis.) London, 1860. Copy of Broadwood's medium pitch, made for the Society of Arts, 1860 (see EA 445·9 and (1) 446·2).

(2) A **445·5**. (Hipkins and Ellis.) October, 1879, London. Her Majesty's Opera band during performance, from a fork tuned by Mr. Hipkins, and measured by me (see (2) A 444·9).

A **445·6**, EC 529·9 [MC 533·1, JC 534·7], S 3·22. (Ellis.) 1879, London, Covent-garden. Fork in the possession of Mr. Pitman, organist, and Sig. Vianesi, conductor, to which the organ at Covent-garden Opera was tuned at the beginning of the season of 1879. Mr. Pitman said that the new pitch was settled at the end of the previous season, because it was impossible to get the oboe, bassoon, and flute to play at a lower pitch. He also said that the singers themselves, having been used to a higher pitch, objected to using a low one. During actual performance, when the organ A was given out for the band to tune from, Mr. Hipkins found A 449·7; see also A 441·2.

A **445·7**, EC 530·1 [MC 533·2, JC 534·8], S 3·22. (Ellis.) 1860, London. Fork made by Mr. J. H. Griesbach to represent 2 A equally tempered to his 1 C 528, which was really C 534·46 (see (1) A 449·4). The box containing it says:—"The Pitch of the Fork producing the note 2 A [in musical notation] derived from the above-named 1 C [also in musical notation], was obtained by a monochord, the length of its string 20 in., tuned to the note 2 C [in musical notation] from the 1 C 528 vibrations in a second, the whole length of string being equal to 1000, the tempered 2 A is produced by 594 thousandths." It should be 594·6036. With so short a string, tuned to the Octave below by ear only, errors were inevitable. It is remarkable that this pitch is more nearly what was wanted (A 444) than Griesbach's C 534·46 (see (1) A 449·4). Fork lent by the Society of Arts. (See (2) A 448·4.)

•(1) MA **445·8** [JA 447·2, EA 450·2], MC 533·3 [JC 536·6, EC 535·4], 2 B *flat* 477; pressure, 2¾ in.; S 3·23. (Ellis.) Experimental pipe, intended to be an exact copy of the Hampton-court B *flat* pipe (see A 441·7). The length, diameter, and pressure of wind were the same; yet, instead of 472·6, I obtained 477. The difference must have been in the mouth, foot, and newness, and serves to show the kind and amount of error (S 0·15) that may be expected in the numerous cases where I have had new pipes constructed. Under 3½ in. and 4 in. pressure, the pipe gave B *flat* 478·1 and 480·01, whence MA 446·8 and 448·6. But the pressure 2¾ in. has been retained here because it was that used at Hampton-court, where the original pipe existed.

(2) A **445·8**, EC 530·15 [MC 533·33, JC 535], S 3·23. (Lissajous, from de la Fage.) 1856, Paris, Opera. Exact pitch, on the authority of M. Bodin, professor of the piano and harmony.

(3) EA **445·8** [MA 443·1, JA 441·8], C 530·1, S 3·23; pressure, 3 in. (Ellis.) 30th September, 1867, London, Exeter-hall. Both organs, built by Messrs. Walker; measured from a pipe of the larger organ in their possession. Since sharpened to A 447·3.

EA **445·9** [MA 443·3, JA 441·9], C 530·3, S 3·23. (Ellis.) London, 1849–54. Broadwood's original medium pitch, belonging to the widow of the tuner Alex. Finlayson, who died 1854. The original fork having gone out of the possession of Messrs. Broadwood, a copy was substituted for it, C 530·6. An older copy, made for the Society of Arts in 1860, is C 529·7. These different values, 529·7, 530·3, 530·6, are good examples of the errors usually made in copying. (See (1) A 445·5 and (1) A 446·2.) This pitch was chosen quite empirically, by filing down an older fork. The present fork is the one of which a copy was sent to the French Commission on Pitch, 1858-9, and is called in their Report No. 2, A 452·5, showing that some grave mistake must have been made in measuring, calculating, or printing.

(1) A 446·0, EC 530·4 [MC 533·5, JC 535·2] S 3·23. (Delezenne.) 1854a, Paris; Pleyel's pianos. Fork given to Delezenne by M. Saunier, organist and music-seller, Lille.

(2) A 446·0. (Näke.) 1859, Dresden, Opera. No authority but Näke's own is given, and in Dresden, it is denied that the pitch was ever so high. (See, 438·9.) But, during the performance, the pitch may have risen with the temperature, as it would affect the wind instruments This was probably the case here, the pitch being taken during performance. (See A 445·6, 447·5, (2) 449·9.)

(3) A 446·0. (Fr. Com.) 1859. Austro-Hungary, Pesth, Opera. Apparently from a fork sent by the Kapellmeister, Herr Franz Erkel, who considered it high time to stop the irregularities which had been hitherto allowed in pitch.

* (4) MA 446·0, MC 533·6, B *natural* 498·63; pressure, 3¼ inches; S 3·23. (Ellis.) This was merely an experimental pipe, to show the effect of a difference of diameter, when the length remains unaltered. This pipe was 12 inches long and ⅜ inch wide; compare (1) A 445·8, for one, 12 inches long and 1·2 inch in diameter; A 434·7, for one, 12 inches long and ·95 inch diameter. The following is a comparison of results:—

Pressure.			
Diameter.	2½ inch.	3½ inch.	4 inch.
1·2 in.	V 477·04	478·1	480·01
·95 in.	V 486·87	488·71	490·49
·75 in.	V 497·21	498·63	500·15

(1) EA 446·2 [MA 443·6, JA 442·2], C 530·6, S 3·24. (Ellis.) London, 1·54-79. The copy of Broadwood's medium pitch, now used in their house for pianos not meant for public concerts. See EA 445·9. This is the pitch to which Mr. Randegger has adapted his indications of compass of voice. See Art. 21, p. 303.

(2) A 446·2, EC 530·63 [MC 533·77, JC 535·2], S 3·24. (Lissajous, from de la Fage.) 1856. Paris, Opera. Fork communicated to the French Society of Pianoforte-makers, 1st September, 1856.

(3) A 446·2 (Lissajous, from de la Fage.) 1856, Paris Conservatoire.

(4) A 446·2. (Fr. Com.) 1859. Holland, the Hague, Conservatoire. Apparently the fork sent by M. Lubeck, director of the Conservatoire there, who said that he himself had had to contend with continual rise of pitch.

A 446·6, EC 531·1 [MC 534·2, JC 536], S 3·26. (Delezenne.) Milan, 1845. Fork obtained and lent to M. Delezenne by M. Marloye.

A 446·7, EC 531·2 [MC 534·4, JC 536] S 3·26. (Ellis.) 1876, London Fork bought at Messrs. Cramers', as giving concert pitch; I was offered the Society of Arts forks if I liked, "they only differed by a shade." The corresponding C fork bought at the time was C 533·24, and hence not quite in correct tune with it. I don't know where they were using such a pitch at the time. But I had bought a fork elsewhere, marked "A Walker," some years before, which gave A 446·4, practically the same.

(1) A 446·8, EC 531·3 [MC 534·5, JC 536·2] S 3·27. (Delezenne.) Lille, 1851. Festival organ. Fork by which M. Mazingue (see A 384·3) tuned the organ.

(2) A 446·8. (Ellis.) 1878, Austria, Vienna. Pitch of the opera from a fork sent to me by the organ-builder, Ullman, who has charge of the organ there, as the pitch to which it was tuned. This would, of course, rise with the temperature of the house. In 1860, French pitch was introduced, and was still the rule in 1869, as officially communicated to the Society of Arts. (See A 435·4.) The modern rise, which is stated to be several years old, is comparable to that of Covent Garden Theatre. (See A 441·2, 445·6, (2) 449·9.) For the pitch of the Vienna opera, before 1859, see (2) A 456·1. To the above pitch were tuned the organs of St. Stefan (see (2) A 443·2), St. Michael, St. Peter, and St. Maria Schnee (formerly Minoriten Kirche). This must, however, be taken only as the mean pitch. The church organ of St. Michael was once as high as the larger Franciscan organ (see A 457·6), but the pipes have been pieced throughout, and the pitch lowered. (Abstracted from notes by Herr Ullmann.)

A 447·0, EC 531·8 [MC 534·7, JC 536·4], S 3·27. (Fr. Com.) 1859, France, Marseilles, Conservatoire. M. Aug. Morel, director of the School there, a branch of the Paris Conservatoire, wished to retain old French pitch in order to preserve the brilliancy of the orchestra.

A 447·3 EC 531·9 [MC 535·0, JC 536·7], S 3·28; pressure, 3 in. (Ellis.) 1879, London, Exeter-hall. Both organs built by Messrs. Walker; from a pipe in their possession (see their former state (3) A 445·8.)

A 447·4, EC 532·06 [MC 535·2, JC 536·9] S 3·29. (Lissajous, cited by de la Fage.) Paris, 1856; Italian Opera. Fork communicated by M. Bodin, professor of the piano and harmony.

A 447·5, EC 532·2 [MC 535·3, JC 537·0], S 3·29. (Hipkins.) July, 1878, London. Harmonium at Covent-garden opera. See A 441·2.

EA 447·7 [MA 445·1, JA 443·7], C 532·4 at 59° F., S 3·29. (Ellis.) 1877, Gloucester Festival organ, built by Messrs. Walker, and subsequently removed to Brecon; tuned especially at 64° Fahr, to a fork sent by the organist, Mr. Lloyd, Mus.B. Cantab, which measured C 535·16 at 59° Fahr. Hence the organ pipe was C 535·16, at 64° Fahr, and, consequently, C 532·4 at 59° Fahr. my standard temperature, whence the rest are calculated.

(1) A 448·0, EC 532·8 [MC 536·0, JC 537·6] S 3·3 . (Delezenne.) 1854, Paris. Opéra Comique, as determined by reeds, sold as giving that pitch, for which there is no other authority.

(2) A 448·0. (Lissajous, in Fr. Com.) 1858, France, Paris, Grand Opera.

(3) A 448·0. (Fr. Com.) 1859, Belgium, Liège. Pitch stated by M. Dussoigne-Méhul, director of the Conservatoire, to be the same with that of Paris. He wished to adopt this pitch, as the extreme limit, to prevent further advance.

(4) A 448·0. (Fr. Com.) 1859, France, Lyons, Opera, stated to be the same as Paris. M. Georges Hainl, conductor of the orchestra at Lyons, thought the Paris pitch should be retained, although it was so high, lest the brilliancy of the orchestra might be impaired. This shows how merely orchestral the pitch had become.

(5) EA 448·0 [MA 445·4, JA 444], C 332·8. (Ellis.) 1869, London. Copy made by Mr. Hipkins of a fork shown to him at the Society of Arts Rooms, in 1869, as their standard, but different from Griesbach's. See (1) A 449·4.

(6) A 448·0. (Schmahl.) 1839-40, Germany, Hamburg. Opera under Krebs.

(1) A 448·1, EC 532·9 [MC 536·0, JC 537·7], S 3·32 (Fr. Com.), 1859, Germany, Munich, Opera. Fork apparently sent by Kapellmeister, Franz Lachner, who was warmly in favour of a settled pitch.

(2) EA 448·1 [MA 445·5, JA 444·1], C 532·9, S 3·32 (Ellis.) 1878, London. Fork in the possession of Messrs. Bishop, made by Walker. No other note.

A 448·2, EC 533·1 [MC 536·2, JC 537·9], S 3·32 (Ellis.) 1869, Germany, Leipzig, Gewandhaus Concerts. Fork sent officially to the Society of Arts, and lent for measurement.

A 448·3, EC 533·1 [MC 536·2, JC 537·9] S 3·32 (Delezenne.) 1854, Paris, Opera, as determined by reeds, sold as giving opera pitch. They beat slowly with the Lille theatre fork, see A 450·5, There is no other authority for this pitch.

(1) A 448·4, EC 533·3 [MC 536·4, JC 533·1] S 3·33 (Lissajous, cited by de la Fage.) 1857, Berlin Opera. Fork sent by Herr Taubert, conductor of the Opera at Berlin, to the French Society of Pianoforte-makers.

(2) EA 448·4 [MA 445·8, JA 444·4], C 533·3, S 3·33. (Ellis.) 1860. London. Fork purchased at Messrs. Cramer and Co., the authorised agents of the Society of Arts, stamped "Society of Arts, C 528 vib. per sec." Another copy sold by Cramer measured C 531·1, and I observed that most of the copies showed me beat 1 or 2 in a sec. with one another. (See also (2) A 445·1, 445·7, (1) 449·4, (2) 450·3.) A fork bought at the same time as the first, and stamped "A eq. tempt. to C 528 vib. per sec. Society of Arts," was exactly A 448·4, and hence was an exact EA to this C, but not to C 528, which would give EA 444.

A 448·8, EC 533·7 [MC 536·8, JC 538·5], S 3·34. (Fr. Com.) 1859, Leipzig. Fork apparently sent by Herr Ferdinand David, director of the Leipzig Conservatoire, who expressed himself strongly in favour of a uniform pitch as "putting an end to many doubts, annoyances, and even caprices."

A 449·0, EC 533·96 [MC 537·13, JC 528·8], S 3·35. (Lissajous, Bull. Soc. Enc. liv., 1854.) 1855, Paris, Opera. Experiments made by Lissajous and Ferrand, a first violin at opera. It is stated that Marloye could find no fork or fixed pitch of the French Grand Opera.

A 449·2, EC 534·2 [MC 537·4, JC 539·0], S 3·36. (Hipkins.) June, 1877, London. Pitch of the harmonium at Covent-garden opera. (See A 441·2.)

(1) EA 449·4 [MA 446·8, JA 445·4], C 534·46, S 3·37. (Ellis.) 1860, London. Fork made by Mr. J. H. Griesbach, for the Society of Arts, to represent its proposed standard, 1 C 528. The box containing it has the note:—"The pitch of the fork producing the note 1 C [in musical notation], 528 vibrations in a second, was obtained by my apparatus, for registering and printing the vibrations of strings, shown at the Exhibition of the Society of Arts, 1860." See Art. 13, p. 298. Lent by the Society of Arts; a poor fork, which can scarcely be counted for 10 secs., quite unfit to be a standard. See A 445·7 and (2) 448·4.

(2) A 449·4, EC 534·4 [MC 537·6, JC 539·3], S 3·37. (Ellis.) 1869, Germany; Dresden Opera. Fork sent officially to the Society of Arts, as representing the pitch of the Dresden Band, by the late Kapellmeister Rietz, who, at the same time, says that the Dresden pitch is A 446. Both are apparently errors. Herr Moritz Fürstenau, the librarian, says that no such pitch was ever used at the theatre, and sent me his official fork, A 437·8 (see also (2) A 438·9), which he believed to be A 440. Herr Rietz apparently transcribed the pitch A 446 (which see) from Näke's books, and sent by mistake a Leipzig Gewandhaus fork (see A 448·2), being probably very ill at the time. But the fork is officially sealed, and hence I feel bound to insert it. Lent for measurement by the Society of Arts.

A 449·7, EC 534·8 [MC 538·0, JC 539·7], S 3·38. (Hipkins.) 1879, London; Opera, Covent-garden. Pitch of the band during actual performance. Taken by beats with a measured fork while the organ A was held to tune from (see A 441·2 and 445·6).

A 449·8. EC 534·9 [MC 538·0, JC 539·7], S 3·38. (Fr. Com.) 1859, Prague; Opera.

(1) **EA 449·9** [MA 447·2, JA 445·8], C 535, S 3·39. (Ellis.) 1877, London. Copy made for me by Mr. H. Keatley Moore, of Messrs. Moore and Moore, of the Standard fork used by Messrs. Collard, supposed to be meant for the Society of Arts pitch (see (1) A 449·4, (2) 448·4, 445·7).

(2) **A 449·9**, EC 535·0 [MC 538·2, JC 539·8], S 3·39. (Hipkins.) 1878, London; Covent-garden Opera. Pitch of the band during actual performance (see A 441·2 and 449·7).

(1) **A 450·3**, EC 535·5 [MC 538·7, JC 540·4], S 3·40. (Lissajous, cited in Fr. Com.) 1856, Milan; Opera.

(2) **EA 450·3** [MA 447·6, JA 446·3], C 535·5, S 3·40. (Ellis.) 1860, London. Copy by Mr. Allen, of Percy-street, of the Society of Arts standard, lent me by Mr. Blaikley, of Boosey's.

A 450·5. EC 535·6 [MC 538·8, JC 540·6], S 3·40. (Delezenne.) Lille, 1848 and 1854; Opera. From forks tuned by M. Colin, Oboist, during the performance of "Robert le Diable," 27 April, 1854, between the acts, and carefully verified. It was on the occasion of measuring this fork, that Delezenne ascertained the importance of having a string on his sonometer, which was as thin as could bear the strain of tuning. Using strings of ·6154 and ·1280 millimètres in thickness, he found that the lengths which gave the unison to the fork were 203·8 mm. on the first, and 198·9 on the second. The former gave a pitch of V 439·645, and the latter V 450·4776. He, therefore, believes that the thickness of the string produced in this case an error of V 10·8326, or S 0·42. (Lille, mem. 1854, p. 1.)

EA 450·6 [MA 448·1, JA 446·7], C 536, S 3·41. (Ellis.) 1877, Glasgow; Public Halls. From the fork settled by the organist, W. T Best, and the late Henry Smart, organist and composer, as the pitch for this very fine organ, temperature not stated, erected by Messrs. T. C. Lewis and Co., of Brixton, lent me by Messrs. Lewis. This is, apparently, a rather sharp Society of Arts fork, and is nearly up to concert pitch.

A 450·8. EC 536·0 [MC 539·2, JC 540·9], S 3·42. (Wieprecht, cited by Fr. Com. 1858, Germany, Berlin; Opera. Original statement not found.

A 451·0. EC 536·3 [MC 539·5, JC 541·2], S 3·43. (Mahillon.) 1879, Bruxelles. The standard for brass instruments made for the Belgian army, by V. Mahillon. The fork sent to me, sold commercially, was A 451·9, and as M. Mahillon could not guarantee its exactness, I have entered the pitch as it exists theoretically. A large fork subsequently sent to Dr. W. H. Stone was A 451·7. (See further details in Appendix No. 10.)

(1) **A 451·5**, EC 536·9 [MC 540·1, JC 541·8], S 3·45. (Lissajous, in Fr. Com.) 1858, Russia, St. Petersburgh, Opera. The tuning-fork sent by M. de Lwoff, master of the court and director of the Imperial Chapel at St. Petersburgh, was a C fork, from which this A must have been calculated, and as the three C forks of Broadwood were misinterpreted as A's by the Fr. Com., there is some doubt of this also. M. de Lwoff was strongly against a high pitch, and considered that it greatly deteriorated stringed instruments by imposing thin strings on them.

(2) **A 451·5**, EC 538·17 [MC 540·12, JC 541·8] S 3·45 (Näke.) 1862, Germany; Berlin Opera. Näke does not speak confidently, as if he had measured it.

(1) **A 451·7**, EC 537·4 [MC 540·4, JC 542·0], S 3·45. (Lissajous, from de la Fage.) 1867, Milan; Scala Theatre. Fork communicated to A de la Fage, by the director of the Journal *L'Union Instrumentale*.

(2) **EA 451·7**, [MA 449·1, JA 447·7], C 537·2, S 3·45. (Ellis.) 1878*a*, London. Fork in possession of Messrs. Bishop, marked C Philharmonic, possibly meant for the same pitch as A 452·5.

A 451·8. EC 537·2 [MC 540·4, JC 542·1], S 3·46. (Fr. Com.) 1859, Berlin; Opera.

A 451·9. EC 537·4 [MC 540·6, JC 542·3], S 3·46. (Ellis.) 1878, London. British Army Regulation. Pitch for wind instruments, from a fork sent by Dr. W. H. Stone. Compare A 451.

A 452. EC 537·5 [MC 540·7, JC 542·4], S 3·46 (Fr. Com.) 1859, Lille Conservatoire. Apparently the fork sent by M. Victor Magnien, director of the Imperial Academy of Music, a branch of the Paris Conservatoire.

EA 452·5 [MA 449·9, JA 448·5], C 538·2, S 3·49. (Ellis.) London, 1852-1874. Mean of the pitch of the Philharmonic Band, while under the direction of Sir Michael Costa. 1846-1854; tuned, during that period, by Mr. J. Black, of Broadwood's, approved by Sir Michael Costa, and recorded by Mr. Hipkins. Retained as Broadwood's highest pitch till 1874, when the pitch was sharpened at the instance of Mr. Charles Hallé, see EA 454·7. This was London, No. 3, of the French Commission of 1858-9, where it is given as A 455, showing an inaccuracy of measurement, calculation, or printing. The copy of this fork, prepared for the Society of Arts in 1860, was C 538·1.

A 452·8. Schulze's Tynedock organ. (See Appendix No. 11.)

A 452·9, EC 538·6 [MC 541·8, JC 547·2], S 3·50. (Ellis.) 1878, London; Kneller-hall Training School for Military Music. From a fork lent by Dr. W. H. Stone. The fork belonging to Messrs. Boosey, horn-makers, lent by their manager, Mr. Blaikley, gives A 452·5, the difference, ·4 vib., is merely a difference of fork-makers. Messrs. Boosey also used a fork C 538·2, which is in close agreement with the calculated EC above.

A 453·0. EC 538·7 [MC 541·9, JC 543·6] S 3·50. (Schmahl.) Glückstadt, in Holstein. Organ built 1645; improved by Schnitger, 1685: examined by Herr Schmahl, in 1879, who found A between V 445 and 444·5, at 4° R. = 41° F, giving A 453·3 or A 452·8, at 59° F, for which I have selected 453 as a mean. This cannot be distinguished in intention from Lehnert's *positiv*, A 455·2, although it is S 0·09 flatter.

EA 453·4 [MA 450·7, JA 449·3], C 539·2, S 3·52. (Ellis.) London. Copy by Mr. Allen, of Percy-street, of a fork used by Sir M. Costa, at Covent-garden Opera; date unknown. (See A 452·5 and (1) A 454·7.) Sent me by Mr. Blaikley, of Messrs. Boosey.

EA 453·9 [MA 451·2, JA 450·0] C 539·8, S 3·54. (Ellis, at 59° F.) London. Concert organ pitch of Mr. Henry Willis, to which are tuned the large organs of the Albert Hall, and Alexandra Palace. This important pitch, writes Mr. H. Willis to me, "was arrived at by actual and continued observation of the pitch of orchestras, especially when there was no organ to embarrass it." It gives C 543·2 at 65° F. for which Mr. Willis estimated it at C 541. At 61·5° F. when I measured the pipe, it was C 541·2, precisely the same as Albert Hall when measured by Mr. Hipkins (see A 455·1). Mr. Willis builds all his concert organs to this pitch, thus re-establishing the old difference between chamber (= concert) and church pitch. For Mr. Willis's church pitch see A 445·2.

A 454·0. EC 539·9. [MC 543·1, JC 544·8], S 3·54. (Näke.) 1862, Austria, Vienna. Piano of Kapellmeister Esser, while the orchestra was at A 466, the regular fork at A 456·1, and the piano of the other Kapellmeister Proch at (1) A 445; see those pitches.

EA 454·1 [MA 451·4, JA 450] C 540, S 3·55. (Ellis.) London, Feb., 1877, Crystal Palace. From a fork in Mr. Hipkins's possession, tuned under his direction to the piano supplied for the Crystal Palace concerts of that day. (N.B.—This is the pitch wrongly attributed to the Philharmonic of that date in my former paper, Soc. Arts *Journal*, 25th May, 1877, p. 683, under C 544·3.) Dr. Stone had an A fork, made to the same band in March, 1877, which I measured by Appunn as A 458, and on reducing by 7·6 per thousand, this will become A 454·6, agreeing very closely with the above, but the fork having been lost, I have been unable to re-measure it.

A 454·2. MC 543·4 [JC 545·0, EC 540·2], S 3·55. (Ellis.) 1715*c*, England, London. Very old fork, of the same shape and workmanship as Mr. Driffield's tenor A (see A 419·9), but S 1·36 sharper. It is nearly as sharp as the highest London pitch in 1879. Found in Myatt's market gardens, Brixton, March, 1878 (gravelly subsoil), when the land was cleared for building, and given me by Mr. Hipkins. There is no impressed mark upon it; but it was written on with ink, and this has left a rust mark. The whole fork is, however, so rusty, and the surface of the iron so disintegrated, that it is difficult to discover what was meant. To the naked eye there seems to be LA on one side, and A on the other, and I have adopted this theory; but under a magnifying-glass, the letters seem to disappear. It is exactly a mean-tone large semitone sharper than A 424·5, that is, it would coincide with a mean tone B *flat* on an organ of that pitch, and it seems, therefore, intended to be a semitone higher than the ordinary pitch of the time, the semitone being necessarily taken large in order to agree with a note on the organ. It thus became a higher chamber pitch, and would seem to establish the existence of such a pitch in England. See notes on the two organs at the Franciscan Church at Vienna, under A 457·6. On account of its very rusty state it may have flattened a little, but certainly not more than V 4 in V 1000, or V 1·8; see Art. 10, p. 297. Supposing it had suffered to this extent, it would have been A 456, or MB *flat* to A 426·2, which is almost precisely the original pitch (A 425·9) of Byfield Jordan and Bridge's organ, at St. George's Chapel, Great Yarmouth.

(1) **A 454·7** [MA 452·0, JA 450·6], C 540·8, S 3·57. (Ellis.) Unknown date, London. Copy made for me by Mr. H. Keatley Moore, of Messrs. Moore and Moore, of a fork at Messrs. Collard's, used by Sir M. Costa at Covent-garden Opera, several (unknown) years ago. (See A 452·5 and A 453·4.)

(2) **EA 454·7.** (Ellis.) London, July, 1874. Fork representing the highest pitch of the Philharmonic concerts, observed by Mr. Hipkins; tuned under his directions. Used as Broadwood's highest pitch since 1874, at the suggestion of M. Charles Hallé (see EA 452·5).

(3) **454·7.** (Ellis.) London, 1879. Fork lent by Messrs. Steinway, as showing the pitch of their London pianos.

(4) **EA 454·7.** (Ellis.) London, 1878. Messrs. Bryceson's band pitch, to which they tune their high pitch organs. They, however, also tune in French pitch. St. Michael's, Cornhill, which was rebuilt by Messrs. Bryceson, was tuned to this pitch.

EA 455·1 [MA 452·4, JC 451·0], C 541·2, S 3·58. (Hipkins and Ellis.) May, 1877. Wagner Festival at Albert Hall, giving, therefore, the pitch of the Albert Hall organ. Observed by Mr. Hipkins with a fork measured by me; temperature probably 61½° Fahr. (see A 455·9). Dr. Pole, on the delivery of my first paper, May 23, 1877, said he had just been dining with Herr Wagner, who "complained bitterly of the inconvenience his singers had been put to, on account of the fact that the pitch they were obliged to sing to here was so much higher than that which they were accustomed to." For Munich pitch see A 435·4; for Vienna see (2) A 446·3; these were the chief places the singers came from.

EA 455·2 EC 541·3 [MC 544·5, JC 548·7], S 3·59. (Schmahl and Ellis.) 1749, Hamburg; an old chamber organ, or *positiv*, built

for a bürgermeister by Lehnert, in possession of Herr Schmahl, who took the pitch by forks, which I measured and reduced, as 2 B *flat* 483·9 and 1 C *sharp* 572·8; these are only S 2·92 apart, which may be possibly an equal minor Third out of tune. The two measurements give respectively EA 455·8 and 454·6, of which I have taken the mean, which is S 1·90, or very nearly one equal tone sharper than St. Michaelis, Hamburg (see A 407·9), and almost exactly in accordance with present English concert pitch.

A 455·3, EC 541·5 [MC 544·7, JC 546·4], S 3·59. (Ellis.) 1879, London. Fork lent by Messrs. Erard, as representing their concert pitch.

A 455·5 EC 541·7 [MC 544·8, JC 596·6], S 3·59. (Fr. Com.) 1859, Belgium, Brussels, band of the Guides (see A 451·0). Apparently the fork sent by M. Bender, musical director to the King of the Belgians, and of the regiment of Guides. M. Bender was in favour of two standard pitches, one for military music, and another a quarter of a tone lower for theatres, and he put this in practice himself (see (3) A 442·5). He considered the Guides pitch unsuited for vocal music. (See Appendix No. 10, at end.)

EA 455·9 [MA 453·2, JA 451·8], C 542·2, S 3·62. (Ellis.) 1877, London. From a fork lent by Dr. W. H. Stone, copied from one used by one of Messrs. Chappell's tuners. The fork was a very poor one, and its beats could not be counted for more than four secs., hence there is a possible error of V 0·5.

(1) EA 456·1 [MA 453·4, JA 452·0], C 542·4, S 3·62. (Lissajous, from de la Fage.) London, 1857. Sent by M. Bettini, director of music at the London Italian Opera to the (French) Society of Pianoforte-makers. There is no English corroboration for this pitch so early as 1857, and it has even now not been reached.

(2) A 456·1, EC 542·4 [MC 545·6, JC 547·3], S 3·62. (Ellis.) 1859*a*, Vienna. Fork kindly tuned for me by Messrs. Streicher, pianoforte-makers, of Vienna, from a fork in their possession, giving the orchestral pitch of Vienna, the celebrated "sharp Vienna pitch," in use before the introduction of the French Diapason Normal. See end of notes on (2) A 422·3.

EA 457·2 [MA 454·5, JA 453·1], C 543·7, S 3·66. (Ellis.) 1879, New York. Fork obtained from New York by Messrs. Steinway, to show the pitch to which they tune their pianos there. See A 454·7, for their English pitch, which has been assimilated to Broadwood's.

7. *Church Pitch, High.*

A 457·6, C 544·7, EC 544·2 [MC 547·4, JC 549·1], S 3·68. (Ellis.) 1640*c*, Austria, Vienna. Great Franciscan organ, which, in Herr Ullmann's notes, is stated to be 240 years old in 1878, and to possess its original pitch (*ihre Urstimmung*). It is only used for leading the ecclesiastical chants ("zur Führung des Kirchengesanges"), the original use of these high organs. Comparing its pitch with that of the Brixton fork, A 454·2, and the notes there, it seems probable that the original pitch of the smaller organ in this Franciscan church, may have been that of a MA 427·7 = the MB *flat* on this higher instrument, which would have allowed the two instruments to be played together by transposing a semitone. Afterwards, and for the same reason, when the higher organ was put into equal temperament (the actual C of the instrument is 544·7, in place of the correct 544·2 given above), the MB *flat*, 427·7, would have become EB *flat*, 431·9, which, taken as A, may have been the pitch of the lower instrument. Even after the lower pitch had been raised to A 442·7, as at present, Herr Ullmann says, that the higher instrument is half a Tone above the lower, though the difference is now only S 0·57., that is, very nearly a quarter of a Tone, and, consequently, the organs can no longer be played together. The real intention of the lower instrument was clearly to introduce the lower concert pitch (Kammerton) at a semitone lower, so as to allow of playing the two instruments together. The pitch is derived from two forks tuned for me by organ-builder Ullmann, as A 454·4 and C 540·9 at 9° R, which reduce, as above, at 59° F.

A 466·0 EC 554·2 [MC 557·5, JC 559·2], S 3·99. (Näke.) 1862, Austria, Vienna. The highest pitch known to Näke. But see A 456·1. In a letter of 27 Aug., 1878, to Mr. Hipkins, Herr Streicher, the great Vienna pianoforte-maker, says:—"The reason why Herr Karl Näke makes the pitch much higher than the fork I sent you, may be simply that, in former years, the orchestra of the Opera House practically played a strong beat higher than the usual fork, as is also practically the case now. At present, the French Diapason Normal passes for being the official fork; but, practically, the real pitch is a strong beat sharper than the official fork." See (2) A 446·8 for this practical pitch, and for similar phenomena, at Covent-garden Opera, see A 445·6 and 449·7, and (2) A 449·9. Hence we must take this as an extreme pitch, partly caused by the warmth of the house. See A 424, for another instance.

A 474·1, MC 567·2 [JC 568·9, EC 563·8], S 4·29. (Ellis.) England, 1668. Tomkins.—(Dr. Armes.) 1683, Bernhardt Schmidt's organ, at Durham Cathedral.—(Ellis.) 1708, B. Schmidt's organ, at the Chapel Royal, St. James's Palace.—(Ellis.) 1708 to 1748, the Jordans's organ, at St. George's, Botolph-lane. To begin with the second. In Feb., 1879, I measured an old A pipe at Durham, as (1) A 443·1 (which see). Since that time, Dr. Armes, the organist of Durham, has examined every pipe and board of the old instrument, and discovered that, as originally built, it was a 16 F organ; and that shortly after, two "quarter-tones," namely, A *flat* and D *sharp*, were added to G *sharp* and E *flat*, as on the Temple organ (written, however, as two G *sharps* and two D *sharps*, in Schmidt's own hand, still legible). In 1815, as Dr. Armes thinks to be most probable, the pipes were shifted a whole tone, and the organ made a 16 G organ. In this case, one of Schmidt's G *sharps* was made into an A, and the other into B *flat*, and two new pipes were added, which Dr. Armes now has, so that the compass which extended originally to ½ C, was raised to ½ E. The pipe I measured as 2 A, was a 2 G *sharp* in the old organ, and that gives the pitch at the head of this article. That is, the organ was originally a great semitone sharper than it was when Bishop dealt with it. The B *flat* pipe I saw, which was exactly a foot long, was, therefore, originally an A pipe; that is, the Durham was an A foot organ; and this leads directly to Tomkins's pitch. In the preface to Rev. Sir F. A. Gore Ouseley's "Collection of Sacred Compositions of Orlando Gibbons, 1873," he quotes from the end of a list of errata appended to the "Pars Organica" of Thomas Tomkins's "Musica Deo Sacra," "published in 1668, but composed for the most part before the time of the Commonwealth," the note "*f* [meaning 4 F] *sit tonus fistulæ apertæ longitudine duorum pedum et semissis; sive 30 digitorum geometricorum*" [let the pipe 4 F be 2½ ft. or 30 in. in length]. This note, Sir F. Ouseley informs me, in a private letter, "occurs in an extra page of errata at the end of the 5th volume, or 'Pars Organica.' I have reason to believe," he continues, "that it must have been a subsequent insertion after many copies of the work had been printed off, as it does not occur either in the Bodleian copy, or the copies preserved in the British Museum and the library of Christ Church, Oxford, which I have collated." In the preface, already cited, he observes that "an open pipe two feet and a-half in length will not produce our modern F, but a somewhat sharp G, so that it is plain that, by transposing the Church music of that period upwards of a whole tone, we are, in fact, restoring it to that which was intended by the composer." This estimation of the pitch of Tomkins's F is slightly incorrect. Tomkins's F was Handel's G, being the modern concert F *sharp*; that is, Tomkins's was only a semitone sharper than our present concert pitch, a circumstance of importance as respects the conclusion drawn from Tomkins's rule for Orlando Gibbons's pitch, on which see A 567·3, towards the end, where it appears that his pitch may have been much sharper still. On the Durham organ, however, such a pipe as Tomkins described existed, the resulting pitch being a great semitone sharper than Schmidt's Hampton-court pitch, which might always be obtained by shifting the pipes of the sharper organ, although it was, most probably, original at Hampton-court. The sharper pitch was a whole tone sharper than Handel's. At this time, however, there was a still further reduction of a whole tone below Schmidt's usual pitch, used at Trinity College, Cambridge (see A 395·2). Now Tansur (b. 1700), having a son a chorister at Trinity College, Cambridge, and writing in 1746 ("New Musical Grammar," by W. Tansur, for the use of which I am indebted to Mr. Herrman Smith), says (p. 57), "Our *new Consort Pitch* is more fitter for *vocal performance* than the *old Consort Pitch*, which is half a *tone* lower," probably showing one of these changes. Even B. Schmidt himself may have used one of these flatter pitches for chamber organs, for Mr. C. A. Bishop informs me that he remembers "cutting down" such an organ to Smart's pitch, A 433·2, which, of course, implies that the organ may have been as flat as Handel's A 422·5, or a tone below B. Schmidt's higher pitch. Now the following note (for which I am indebted to Mr. Ebenezer Prout), makes it probable that there were two pitches current in England about or before 1714. "In a version of one of the Chandos anthems (Chrysander says earlier), written for the Chapel Royal, and published by the G.H.S. [German Handel Society] for the first time, called "O sing unto the Lord a new song," the air, "Sing unto the Lord and praise His name" is, in Handel's MS., in the key of E minor; but, as in this key the voice part lies very high, a note is added in the composer's handwriting, intended for the copyist. 'This verse must be transposed a tone lower in all parts—*in the organ part two tones lower*." This, of course, ought to imply that the organ was one tone too high. Which Chapel Royal was intended does not appear. The Chapel Royal, Whitehall, was burned in 1698, and the banquetting-hall, in which was B. Schmidt's organ, was opened as a Chapel Royal in 1715, but I am told that no anthems were performed there. I think, however, that this organ was very probably as sharp as the Durham one, as it was the first B. Schmidt built in England, 1662. Elliott, in 1814, removed all the old pipes of this organ, except a few stopped wooden ones, and tuned it to the flat pitch (Handel's) then in vogue. It was stored away from 1827 to 1837, and then re-erected without alteration. But, in 1844, the swell was added, and the pitch raised to that of Hampton-court. This information was given me by Mr. T. Hill. Nothing, therefore, can be learned of the original pitch of this organ. The old organ of St. James's Chapel Royal was also built by B. Schmidt, in 1708, and erected, after his death, by his son-in-law and successor, Christopher Schreider, in 1710. This organ remained in the chapel till 1837, when it was removed to Rev. Peter Hall's private chapel, Long-acre, and thence to the chapel of Mercers-hall, where it was set up by Robson in 1868. This organ I measured and examined on 25 February 1880. The pitch at 59° F. gave C 529·1, B 498, A 442. Supposing the C to be right, we should have MB 494·4, MA 442·2, and EB 499·4, EA 444·9. Hence the organ was very imperfectly tempered, but assuming that C 529·1 was right, we have MA 442·2 as its pitch, which is practically that of Hampton-court A 441·7. After measuring, I examined the marks on several pipes of the prin-

cipal on the great organ, and found that it had been shifted a great semitone; thus, the old B *natural*, B *flat*, C, D, D *sharp*, had become new C, B, C *sharp*, D *sharp*, E, respectively. The old marks were quite distinct and of the old form, the D and D *sharp* in particular being the German old forms used by Praetorius. The shifting was effected probably more than 100 years ago, as the newer markings had every mark of age. This, then, pretty well established the fact that B. Schmidt or Chr. Schreider made organs in this sharp pitch as late as 1708-10. Also, as I am told that Handel constantly played upon this very organ, it seems not improbable that his note to the copyist referred to it. At the same time, the probability of the Whitehall Banquetting-hall organ having been as sharp, is strengthened. Purcell, 1658-95, was organist there, and also at Westminster-abbey, organ built by Schreider and Jordan in 1730. Now, Sir F. A. Gore Ouseley says, in a private letter :—"To illustrate the variations of pitch, it would suffice to compare together the sacred and secular vocal music of English composers from Gibbons to Blow, *i.e.*, throughout the 17th century. In the case of Purcell, what tenor could possibly sing 'Come if you dare' or 'Britons strike home' at the pitch indicated in Tomkins's book? Or what bass could possibly have sung his 'They that go down to the sea in ships' [which has a scale from 2 D to 8 D in the key of D] if the pitch had been so low as the forks of that period indicate?" But Handel wrote both higher and lower, and Mozart as low. Now, as to Westminster, I put it "flat" in (2) A 422·5 as the earliest pitch I could find. But this organ of St. James's Chapel Royal makes a high pitch probable for Schreider, one of its builders; and the organ built by Jordan in St. George's, Botolph-lane, shows that the other of the two builders of Westminster-abbey organ also used a sharp pitch. This last organ was rebuilt by Mr. T. Hill, and he found it so sharp that he was obliged to shift the pipes a semitone down, that is, to make the old C his C *sharp*, in order to bring it approximatively to his own pitch, which is that of Hampton-court; this, of course, means taking B *natural* as C, and this pitch gives MB *natural* 526·7, Mr. Hill's being C 525·3, so that they are practically identical. But perhaps this may belong to the series of organs represented by the Brixton fork A 454·2. (Some further observations will be found in the Appendix No. 12.) I beg to express my obligations to Rev. Sir F. A. Gore Ouseley, Dr. Armes, Messrs. Ebenezer Prout, T. Hill, C. A. Bishop, Herrman Smith, R. Massey (late of Whitehall Chapel Royal), C. S. Jekyll (of St. James's Chapel Royal), and N. W. B. Collyer (of Mercers-hall), for their assistance in conducting this difficult investigation. In order to compare the series of English organs which existed in England, I give the pitches of their 12 notes in mean tone temperament, assuming, not the pitches as determined by actual measurement, but the pitches as derived from Handel's fork. 1). Is the pitch of Trinity College, Cambridge (see A 395·2), here derived as a mean Tone below (3). 2) Is Handel's pitch derived from his own fork (see A 422·5). 3) Is the pitch of Hampton-court Organ derived as a great semitone below (5). 4) Is the Brixton Fork pitch (see A 454·2), here derived as a great semitone above (2). 5) Is the pitch of this article, here derived at a mean Tone above (2). It will be seen that these pitches agree practically with those found by measurement, and it will also be seen what kind of errors are introduced by shifting, and have to be corrected by the organ-buildor.

Mean Tone Notes.	1. Trinity College.	2. Handel.	3. Hampton-court.	4. Brixton.	5. Durham.
2 C	236·2	252·7	264·1	270·4	282·5
2 C *sharp*	246·8	264·5	276·0	282·6	295·2
2 D	264·1	282·5	295·2	302·3	315·9
2 E *flat*	282·5	302·3	315·9	323·5	330·1
2 E	295·2	315·9	330·1	338·0	353·2
2 F	315·9	338·0	353·2	361·7	369·0
2 F *sharp*	330·1	353·2	369·0	377·9	394·9
2 G	353·2	378·8	394·9	404·4	422·5
2 G *sharp*	369·0	394·9	412·6	422·5	441·5
2 A	394·9	422·5	441·5	452·1	472·4
2 B *flat*	422·5	452·1	472·4	483·7	493·6
2 B	441·5	472·4	493·6	505·6	528·2
1 C	472·4	505·4	528·2	540·8	565·1

A 480·8, C 575·3 [MC 575·1, EC 571·8, JC 577·0], S 4·54. (Degenhardt and Ellis.) 1879, Germany, Hamburg, St. Catherinen Kirche. This organ was built by Hans Stellwagen in 1543, and has been frequently repaired. Herr Schmahl (see A 489·2) thinks it hardly possible that it should have kept its original pitch. But Herr Degenhardt, the organist, himself assures me that, even at the last repairing, 1867-9, the pitch was never altered. It must, however, be considered doubtful, as there is no proof that it may not have been somewhat altered in olden times. The pitch was taken for me by Herr Degenhardt, by tuning-forks at 15·2° R., and subsequently reduced. It is V 8·4, or S 0·30 flatter than old St. Jacobi at Hamburg, A 489·2, but possibly they were meant to be in the same pitch. A to C forms an almost exact mean-tone minor Third. But the C was tuned from the Choir Organ (*Oberwerk*) and the A from the Great Organ (*Hauptwerk*), and the C may have been tuned too sharp by Wolfsteller, as the temperament is intentionally equal. Herr Schmahl says that this wide minor Third, A to C, results from the method of tuning used by Wolfsteller, in which A was tuned first and C last, and became faulty, as his Fifths and Fourths were too nearly just. This was the case as early as 1840-48, so that the major keys of F *sharp* and D *flat* were better tuned than those of C and G on this organ.

MA 483·7 [JA 480·6, EA 485·6], MC 578·6 [JC 576·6, EC 577·5], 1 G 865·13, S 4·64. (Ellis.) 1790, Padua. A fork preserved in the Istituto di Fisica of the Royal University, at Padua, and copied for me exactly, under the direction of Sig. Fr. Rossetti (see A 425·2 for references). It was inscribed *Sol*. The original was probably made under the direction of Signore Stratico, professor of mathematics and naval science at Padua, from 1764, and of physics also from 1777 to 1798, for the purposes of his excellent essay on qualities of tone (Mem. dell' I.R. Inst. del. regno Lomb. Veneto, years 1814 and 1815, pp. 171—218). It is the fork No. 1 of the memoir of Prof. Zantedeschi. Prof. Zantedeschi cites it as an example of the instability of tuning-forks, supposing that it must have been originally 1 JG 768 to 2 C 256, and finding by ear that it agreed with 1 A of Colbacchini's pitch-pipe (really V 844·4 or S 0·42 flatter), which he also believed to be 1 JA 853·3, 2 C 256, he supposed that the fork must have gained V 85½. There is no reason whatever for supposing this fork to have been originally at a lower pitch. This 2 G 432·56 is very nearly the French A 435·4, compare A 484·1. Whether Stratico took it from any existing organ or not does not appear, so that we cannot be certain that it represented an acknowledged Italian pitch.

A 484·1, EC 575·7 [MC 579·1, JC 580·9], S 4·65. (Jimmerthal.) 1878, Germany, Lübeck, Cathedral, smaller organ. Herr Jimmerthal, the organist, says that in summer, at 16° R. (68° F.), the new great organ by Schulze is at French pitch, and the old small organ has then its 2 G in unison with the 2 A of the other. The above has been calculated from these data. But Herr Jimmerthal adds that 30 years ago the old organ was a few beats (*einige Schwebungen*) lower. Possibly, therefore, it originally agreed with St. Catherinen Kirche, Hamburg (see A 480·8) Herr Jimmerthal considers that the old organs in Lower or Northern Germany are tuned thus high out of economy to save large metal pipes.

EA 489·2 [MA 490·2, JA 488·7], EC 581·8 [MC 586·4, JC 586·4], 2 E 366·5, S 4·84. (Schmahl and Ellis.) 16-8, Germany, Hamburg, St. Jacobi Kirche. This organ was built in 1688-93, by Schnitger, of Harburg, in Hanover, and afterwards of Hamburg, an admirer of Werckmeister, who in his *Orgelprobe* (2nd edition, 1698), says that he can only recommend equal temperament. Herr Schmahl, the organist (see authorities), says that he has no doubt that the organ was originally tuned in intentional equal temperament, although actual equal temperament was not produced till Scheibler's discoveries. There is no mention in the archives of the organ, which Herr Schmahl has searched for the purpose, of any alteration of tuning, and the organ was in intentional equal temperament when he became the organist in 1838, and he never recollects having heard of any other but intentional equal temperament in the North of Germany; and his master, Demuth (d. 1848), of St. Catherinen Kirche (see A 480·8), whose memory extended to 1810, also could recollect no other but such equal temperament. Of course, the temperament was never perfectly equal, and when Herr Schmahl practised on the St. Catherine's organ, the usual keys of C, G major, &c., were not so good as the unusual F *sharp* and D *flat*. In 1720, J. S. Bach played on St. Jacobi organ, and, according to Bitter's life of Bach, expressed himself very pleased with the tuning, and as J. S. Bach is known to have favoured intentionally equal temperament, this is another resoning for calculating the pitch from 2 E on that hypotheses. It is even reported that J. S. Bach applied to be organist to this organ, but was defeated by a clerical competitor of mediocre powers, who advanced some money for the purpose. The pitch of 2 E was determined by an old pipe preserved in the organ case, which was found to beat flat four times in a second, with 2 E on the organ as now tuned, for which see A 494·5. From this all the other numbers are calculated. Observe that this old pitch is almost exactly one equal tone sharper than the modern French pitch. There is an old peal of bells in the church which is just a little flatter than the modern pitch, and probably agrees with the old pitch. There does not appear to have been any special music written for this high pitch, at least Herr Schmahl does not know of any, and he is accustomed, on the organ as now tuned, to transpose everything at sight a tone lower. Hence, probably, the traditional reason for the old high pitch had died out before this organ was built, though it was retained in the old High Church pitch, or very nearly so. But this organ originally possessed one stop, an 8-foot Gedact, which was in the chamber pitch, a minor Third lower (or EA 411·4, JA 407·7), as shown by the church archives for delivery in 1693, and renovation 1721. In 1761 this stop was replaced by an 8-foot Gamba in the pitch of the other stop. This is the only instance I have met with of both church pitch and chamber pitch on the same organ. On this subject, Herr Schmahl refers to Niedt's "Handleitung zum General-Bass," vol. 2, 1720, by Mattheson, which I have not seen. The organs at Altona and St. George's,

Hamburg, both by the same maker, are at the same pitch. An old tuning fork, now belonging to Herr Schmahl, but formerly to two or three generations of singers at St. Catherine's, Hamburgh (see A 489·5), was exactly in French pitch. It would seem, therefore, probable that modern French pitch was at one time a chamber pitch corresponding to this St. Jacobi as a high church pitch, but in that case there was another chamber pitch a semitone lower (see A 407·9).

8. Church Pitch, Highest.

A 494·5, C 587·9 [EC 585·1, MC 589·6], S 5·02. (Schmahl and Ellis.) 1879, Germany, Hamburg, St. Jacobi Kirche. Present pitch, determined by beats, counted by Herr Schmahl, made with forks measured by me, all reduced to 59° F. His pitch was given to the organ in 1·66, in order to agree with Scheibler's tempered forks, and is a little sharper than the original pitch, for which see A 489·2. The ragged state of the ends of the pipes necessitated their being trimmed, and had not the organ been sharpened in 1866, it would have been necessary to piece all the pipes, which was not considered advisable.

A 495·5, CE 589·3 [MC 589·7, JC 594·5], S 506. (Schmahl.) 1700, Germany, Rendsburg in Holstein, a tolerably large organ recently broken up, which was measured by Herr Schmahl as G 434 at 7·5° R, giving the above on reduction to 59° F. As the organ was very dusty, it is possible that the true pitch was higher, and may have reached that of Halberstadt, A 505·8.

MA 503·7 [JA 506·8, EA 505·6], MC 602·5 [JC 600·7, EC 601·4], G 450·3, S 5·31. (Ellis.) 1636, Paris. Mersenne's church pitch, with the 8 G on the four-foot French pipe, having V 112·6. (See A 378·6 and "Harmonie Universelle," livre 3me, "Des Instruments à Chordes," p. 147; livre 3me., "Des Mouvements and du Son des Chordes," p. 169.) Mersenne observes that this is the lowest note of his own voice, and that only the deepest and bassest voices in France can descend a Fifth, to the 8 C 75·3 below. Now, in my observations, I found only 16 out of 141 basses who could get so low as this, although 17 others of this number reached 8 D 76, and 15 others got lower still. (See A 567·3.) This, therefore, agrees with Mersenne's statement His own voice, reaching to his 8 G 112·6, or, in Broadwood's medium pitch, to 8 A 111·6, would be, probably, a rather low tenor. (See the tables on p. 302.) This sufficiently confirms this very high French church pitch, which is nearly identical with that of Halberstadt A 505·8, and about a Tone higher than Broadwood's medium pitch A 446·2, although I have found no mention of such a high French pitch elsewhere.

MA 504·2 [JA 505·0, EA 507·2], C 603·2, S 5·35; pressure, 3¼ in. (Ellis.) 1511, Heidelberg. Schlick (see MA 377·0) recommends a pipe 6½ Rhenish feet long, as either 8 F, or as 8 C, a Fifth deeper. I have assumed the diameter to be one-sixteenth of the length, and the very close approximation of the pitch to that of Halberstadt (see MA 505·8), confirms the conjecture.

JA 505·8 [MA 508·9, EA 506·9], JC 606·9 [MC 608·8, EC 602·9], 4 B 284·5, 64 B 17·78, S 5·41, pressure 3½ inches. (Ellis.) Germany, Halberstadt Cathedral Organ, built 1361, repaired 1495, described by Praetorius ("Syntagma Mus.," vol. 2, pp. 97–99, 101–4), who saw it, and gives the name and dimensions of the largest pipe as B *natural*, 21 Brunswick feet long, and 3¼ Brunswick feet in circumference. A Brunswick foot has 285·36 mm. This, therefore, makes the pipe 8846 mm. long, and allowing 1·5 mm. for the thickness of the metal, 314·8 mm. in diameter. Taking a sixteenth of these lengths, we obtain for 4 B, 552·9 mm. long, and 19·7 mm. in diameter. I had a pipe constructed 555 mm. long, and 19·86 mm. in diameter, which, under pressures of 2¾ and 3¼ inches spoke V 282·5 and V 283 respectively. Correcting these numbers by the rule in Art. 8, by multiplying each by 1786·5 (= 3 × 555 + 3 × 20·3), and dividing by 1757·2 (= 3 × 552·9 + 3 × 19·7), we obtain 4 B 284 and 4 B 284·5 respectively. I have assumed the latter as most probable, and calculated the above numbers accordingly. The smaller pressure gives JA 504·9, JC 606·5. The difference is unimportant. It is probable, however, that the very narrow pipe constructed, may be slightly flatter than four octaves above 64 B, so that the extreme sharpness of the result is certainly not exaggerated. Praetorius says that we see by the pipes that the pitch is a good Tone, nearer a Tone and a half above what he considers the suitable church pitch, which A 505·8 really is (see A 424·2). This 64 B would have been practically inaudible, but, being accompanied by numerous other pipes in a "mixture," became effective.

9. Chamber Pitch, Highest, and Church Pitch, Extreme.

MA 563·1 [JA the same, EA 567·6], MC 673·6 [JC 675·7, EC 675·2], 2 F 450·5, S 5·26. (Ellis.) 1636, Paris. Mersenne's Chamber Pitch, "Harmonie Universelle," liv. 3, des instruments à chordes, p. 143, where he says:—"La voix ou la note la plus grave de la basse [of a certain song] est F-ut-fa [=8 F], et parceque ceux qui font la basse dans la chambre, ne vont pas ordinairement plus bas qu'un tuyau d'orgue de 4 pieds ouvert, il s'ensuit que la plus basse note" of the air answers to the note of that pipe, which (see A 373·7 and 376·6) I take to be V 112·6, whence follow all the above numbers. Now, Mersenne gives as the lowest note of a small organ which he had at hand (*quam præ manibus habeo*), the equivalent of a 2-foot pipe (see the reference under A 373·7). It seems, therefore, probable that it was an organ in chamber pitch, similar to that formerly belonging to Christian IV., of Denmark (died 1648), figured by Praetorius ("Syntagma Musici," Sciographia, plate I.), and also described (*Ibid*, vol. ii., p. 80) which proceeded from 8 F to 1 A, having 38 keys, only Mersenne's was an octave smaller, with only 26 keys, possibly 8 F to 1 A, to which he would sing an octave lower, and thus reach his own lowest note, that of the 4-foot pipe (see A 503·7). This is the pitch which Mersenne assumes for his scales (*Ibid*, p. 116), only he takes 8 F 98 in place of 8 F 112·6, owing to his faulty measurement of the pitch of his 4-foot pipe (see A 373·7). See confirmation of this remarkably high pitch in A 567·3.

MA 567·3 [JA 565, EA 570·7], C 678·7, S 5·40. (Ellis.) 1619, North German church pitch, called by Praetorius chamber pitch. This is corroborated by that of Mersenne, A 563·1. It is, however, advanced with considerable hesitation. Praetorius ("Synt. Mus.," vol. ii., p. 80) gives a table of the compasses of the several voices, marking the notes reached with ease and with difficulty. On p. 9, he says, "It must be here, first of all, *in genere*, remembered, that, in the whole of this work" [meaning his table of compasses of the voice and instruments] "everywhere throughout, the Instruments and Voices are not reckoned and arranged by Church Pitch but by Chamber Pitch, as we have already explained that some very properly distinguished it." This refers to *ibid*., p. 15, where he says that, in Prague, and some other Catholic Bands (*Kapellen*), pitch is divided into church pitch and chamber pitch in such a way that "the present common pitch, by which almost all our organs are now tuned, is called chamber pitch, and used only for table and convivial purposes; and this is most convenient for instrumentalists, on account of the wind and stringed instruments. But church pitch, which is a whole Tone flatter, is used only in the churches; first, to enable the vocalists, on whom the greater labour falls in the churches (especially in Catholic churches, on account of the long duration of psalm-singing, &c.), to manage better with their voices, and not be rendered so rapidly hoarse by the sharpness; and next, because the human voice, in its middle and lower regions, is much more pleasant and charming than when it has to shout and scream in its high parts, beyond its power. Hence, *propter alias etiam multifarias commoditates, suavitem singularem ac concentus benè susceptos*, it would be better for all our organs to be tuned and built a Tone or Second deeper. But it is quite impossible to make this change in Germany, and, consequently, we must retain our present chamber pitch (which is now commonly called church pitch in most places)." Now, it would seem almost from his recommending this reduction of a Tone, that the high pitch he speaks of was only a tone above the "suitable pitch," which he himself proposes (see A 424·2), and this would give A 474·3, which is Tomkins's pitch (see A 474·1), and not nearly so high as the existing Hamburg pitch (see A 489·2), or the old Halberstadt pitch A 505·8. In commenting on this last, Praetorius says ("Syntagma Mus.," vol. 2, p. 102):—"This (Halberstadt) organ, and similar work, was a good Tone, nearly a Tone and a-half higher than our present organs, which are suitable for church purposes [*als die unsrige itzige Chormessige Wercke stehen*, a peculiar phrase indicating those in his own 'suitable' pitch], as is shown by the length of the great pipes already cited. And it is, therefore, also probable that long previously, all organs, whether of the size already described or not, may have stood in the same pitch, or even higher, because, during the time of Popery, they were only used for the *choral* [ecclesiastical tones]. Forasmuch as lately the *choral* organs, *which were made a whole Fourth higher or a Fifth lower than our pitch* [meaning the 'suitable' pitch, A 424·2?] were recognised as the most convenient, and were kept to this pitch. And although some organs are deficient, and do not exactly agree with the pitch just described, this defect is not to be attributed to the good will and diligence of those masters who originally built the old choral organs which are still [1619] in use, but is probably due to their not having at that time selected a constant chorist or church pitch [*Choristen- oder Chor-Thon*], as, thank God, is now usual. Also the organs to which good choristers [*chorales*] and screaming voices are engaged, and are present to sing, are often tuned a tone higher or lower, and also by much renovation and tuning have been sharpened considerably above their original condition. Otherwise the above-described pitch, namely, one a Fourth higher or a Fifth lower (in reference to our present usual pitch, otherwise called chamber pitch), is considered to be the most correct, and still so found in the churches of the principal ecclesiastical foundations. And yet many organs will also be found which are a Second [a Tone] lower or higher, and some—not a few—are also tuned and built a semitone higher." This passage seems to imply a general ancient pitch, which was a Fourth higher than Praetorius's own "suitable" pitch. But his language is so confused that, though I have studied it for months, I cannot pretend to be certain. A meantone Fourth above A 424·2 would be A 567·3, as here suggested. But, as I have found no existing trace of such a pitch in Germany, I have endeavoured to deduce his chamber pitch from the account of the compass of the human voice which he gives, and for this purpose, mainly, I made the series of observations recorded in Art. 21, p. 303, and with the tables there given, and Mr. Randegger's statements, should be compared the following, given by Praetorius ("Syntagma," vol. ii., p. 20):—

	Easy Limits.	*Extreme Limits.*
Soprano	2 C to 1 E or 1 F.	4 B to 1 G or 1 A.
Alto	4 F to 2 G or 2 A.	4 E to 2 B *flat*.
Tenor	8 B or 4 C to 2 E.	8 A to 2 F.
Bass	8 C to 4 A or 4 B *flat*.	16 F, 16 G, 16 A or 16 B to 2 C or 2 D.

The Sopranos are described as "Eunuchus, Falsetista, Discantista," and the Alto was the male alto, or counter tenor. But these were not the kind of voices I tried, except, perhaps, in the bass falsetto. Hence the real comparison can only be made in the Bass and Tenor. As regards the extreme limits of the bass, I heard a high pitch 16 B 63·3, from 13, and a high pitch 16 A 56·3, from 2 out of 141 basses. But 16 F, 16 G, were quite beyond any one. Praetorius ("Syntagma," vol. ii., p. 17) quotes only from hearsay that three voices in a Munich choir reached that 16 F "in a strong full voice." If we suppose that 16 F to have been 16 B *flat* 56·7 of Praetorius's suitable pitch, it would be the lowest conceivable pitch for a man to sing clearly. If, then, we assume this to be the value of his 16 F, or take 2 F 453·9, we find A 567·3. But an argument cannot well be founded on such an extremely exceptional case. Praetorius makes 8 C an *easy* note for the Bass. Now, out of 141 basses, I found only eight who could reach a high pitch 8 C 67·6 with ease. It is, therefore, quite out of the question to put the easiest note of the bass so low. The mean easy bass limit was 8 E 81·2, or, 8 E in French pitch. But it would be wrong to call this mean easy for all voices, when at least 49 basses out of 141, that is, more than one in three, could not reach it. But only 24 out of 141 basses could not reach 8 F 84·8, which is the 8 F to Praetorius's "suitable" pitch A 424·2. This, therefore, may be called easy, although about one in six cannot reach it. It is, however, nearly a semitone lower than the 8 F 88·6, which Mr. Randegger assigns as the limit. Hence, I cannot be assigning too high a value to the 8 C of Praetorius's easy bass limit by making it 8 C 84·8, but this gives as before 2 A 567·3. Now, if we adopt this value of A, we should find for Praetorius's easy limits of bass 8 C 84·8 to 4 A 287·6 or 4 B *flat* 321·5, that is, in Broadwood's medium pitch (A 446·2) adopted by Randegger 4 E 83·6 to 2 C *sharp* 281·1, or, 2 D *sharp* 315·5, which are rather low upper limits, according to my observations, so that there is no exaggeration in assuming the chamber pitch of Praetorius's limits to have been a whole Fourth higher than his "suitable" pitch, as the quotation given above seems to imply. The tenor then, would have in Praetorius the limits, 8 B 158·5, or 4 C 169·6, to 2 E 424·2, or in Broadwood's medium pitch from 4 E *flat* 157·8, or 4 E 167·2, to 2 G *sharp* 421·2, which certainly gives a very high lower limit, and a rather low upper limit to the tenor, but still a compass larger than the smallest found in my observations. Praetorius's tenor compass of an Octave and a major Third or Fourth is very small indeed; hence, so far as the bass and tenor voice are concerned, this extraordinarily high pitch accords with the other indications given by Praetorius, and hence I venture to assign it to North Germany. I was much inclined to suppose that Praetorius must have meant the pitch of his tables of compass to have been only a minor Third above his suitable pitch, agreeing with the Halberstadt organ. But to assume a Tone lower than here would give such an impossible "easy" compass to the bass, that I felt obliged to renounce it. A comparison of Praetorius's upper limit of his voices with that used by Orlando Gibbons in England (1583-1625, that is contemporary with Praetorius) is very singular. Rev. Sir F. A. Gore Ouseley, in a private letter to me (16 May, 1878), states that he, who has thoroughly examined and published an edition of O. Gibbons's works, "knows of only three instances in which he wrote 1 E, his usual limits being, for sopranos, 1 D; for altos, 2 A; for tenors, 2 F or 2 E; and for basses, 2 C." Now Praetorius's upper limits are for Sopranos, 1 E or 1 F; for Altos, 2 G or 2 A; for Tenors, 2 E; and for Basses, 4 A or 4 B *flat*, easy, with 2 C or 2 D as extremes. It will be seen that these are practically identical with O. Gibbons's usage. The necessary inference is that the Church pitch for which he wrote was identical with this high Church pitch (confusedly called chamber pitch) of Praetorius. In his madrigals, on the contrary, O. Gibbons uses higher notes. Sir F. A. Gore Ouseley says, "in the madrigal of 'The Silver Swan' he takes his trebles up to 1 G, and in others he takes his altos to 1 C, his tenors up to 2 G, and his basses up to 2 E *flat*." In his madrigal, "O that learned poets," Mr. E. J. Hopkins says he carries one of his trebles up to 1 A. This clearly indicates that Gibbons's chamber pitch was a tone to a minor Third flatter than his church pitch. Assuming his church pitch then to be A 567·3, his chamber pitch would be A 507·3 (practically identical with Halberstadt A 505·8), if we took it a Tone; or A 474·1 (which is the old pitch of Durham Organ, and of Tomkins), if we took it a minor Third, flatter than his church pitch. This would seem to imply that Tomkins's pitch, thought to be extremely high, was really a much flattened pitch, the original cause of the sharpness, the Roman Catholic ecclesiastical tones having practically ceased to exist in England with Elizabeth's establishment of the Reformation in 1588. The following extract from Praetorius bears upon old English pitch, and confirms its former extreme sharpness, as also the high German pitch ("Syntagma," vol. ii., pp. 14–15):—"The ancient church pitch was about a Tone lower and deeper than at present, which may still be seen on old organs and other wind instruments [this may refer to Halberstadt, and making that organ a Tone lower than was usual when Praetorius wrote, would give the higher pitch, as above], and afterwards, from year to year, it was as much raised as is now usual in Italy and England, and in the princely bands of Germany. Although the English pitch on instruments is a very little (*ein gar geringes*) lower, which may be seen on their trumpets and shawms (*Zincken und Schalmeyen*), or oboes, as they call them, which are there manufactured." He proceeds to speak of an attempt to raise the pitch by a semitone, which he deprecates, on account of singers, especially altos and tenors, and also because stringed instruments could scarcely bear the then strain, so that strings constantly snapped, for which reason it was better to play such instruments a tone lower, which he says is a great assistance to vocalists.

TABLE II.

Classified Index to Table I.

Arrangement.—The countries are arranged in alphabetical order:—1. Austro-Hungary; 2. Belgium; 3. England, Scotland, and Ireland; 4. France; 5. Germany; 6. Holland; 7. Italy: 8. Russia; 9. Spain; 10. United States of America.

Under each country, the pitches are classified as—1. Standards; 2. Old Forks; 3. Church Organs; 4. Concert Organs; 5. Operas; 6. Concerts; 7. Pianos; 8. Military Music; 9. Other Instruments.

The Pitch is always that of A, with merely a sufficient description to recognise it. For full details, the A must be looked out in Table I., which is arranged in numerical order. But the S, or number of equal semitones and cents (see Art. 5), by which the pitch is sharper than A 370, is annexed, in order that, by the difference of their S, the relative sharpness of the pitches may be immediately ascertained.

In each division, the towns are generally placed together, and the pitches for each town are arranged chronologically, as far as was practicable—the letter after the date meaning *a*, *ante*, or before; *c*, *circa*, or about; and *p*, *post*, or after; thus, 1800*c* is about 1800, 1800*a* is before 1800, 1800*p* is after 1800.

The mark ,, means that the date or name in the preceding line is to be repeated. The mark ——— in the date or place column shows that the date or place is unknown. When the date is unknown, the pitches are placed in order of sharpness.

Date.	Place.	Pitch.	S	A
		I.—Austro-Hungary.		
		3. Church Organs.		
1640*c*	Vienna	Large Franciscan Organ	3·68	457·6
1780	,,	Organ-builder Schulz	2·25	421·3
1878	,,	St. Stefan	3·13	443·2
,,	,,	Small Franciscan Organ	3·11	442·7
		5. Opera.		
1823	Vienna	Näke (Euryanthe)	2·90	437·5
1834*a*	,,	Scheibler I.	2·76	433·9
,,	,,	,, II.	2·86	436·5
,,	,,	,, III.	2·98	439·4
,,	,,	,, IV.	3·01	440·3
,,	,,	,, V. (Blahetka)	3·04	441·1
,,	,,	Scheibler's Streicher's Fork	3·13	443·2
,,	,,	Scheibler VI. (monstrous growth)	3·21	445·1
,,	,,	Vienna Old Sharp Pitch	3·62	456·0
1862	,,	Näke, sharpest	3·99	466·0
1878	,,	Ullmann	3·27	446·8
1859	Pesth	From Fr. Com.	3·23	446·0
,,	Prague	,, ,,	3·38	449·8
		6. Concerts.		
1845	Vienna	Marloye (Conservatoire)	3·21	445·4
		7. Pianos.		
1780	Vienna	Stein, for Mozart	2·26	421·6
1862	,,	Esser, per Näke	3·54	454·0
,,	,,	Proch ,,	3·20	445·0
		9. Other Instruments.		
,,	Vienna	Sellner's Oboe, per Näke	2·80	435·0
		II.—Belgium.		
		1. Standards.		
1876	Brussels	Meeren's Proposed Concert Standard	2·75	432·0
1879	,,	Mahillon's Army Standard	3·43	451·0
		5. Opera.		
1859	Brussels	Bender's Pitch	3·10	442·5
		6. Concerts.		
,,	Liège	Conservatoire	3·31	448·0
		8. Military Instruments.		
,,	Brussels	Band of Guides (Fr. Com.)	3·59	455·5
		III.—England, Scotland, and Ireland.		
		1. Standards.		
1842	London	Hullah's C 512 = 524·8	3·05	441·3
1860	,,	Society of Arts intended C 528	3·16	444·0

Date.	Place.	Pitch.	S	A
		III.—ENGLAND, &c. (*Continued.*)		
		1. *Standards.*—(*Continued.*)		
1880	London	Griesbach's Soc. Arts C	3·37	449·4
,,	,,	,, ,, A	3·22	445·7
,,	,,	Cramer's ,, A and C	3·33	448·4
1877	,,	,, ,, (Bishop's)	3·20	445·1
,,	,,	Mr. Hipkins's copy of Soc. Arts	3·31	448·0
,,	,,	Allen's ,, ,,	3·40	450·3
1877*a*	,,	Tonic Sol-fa College 1 JC 513	2·50	427·5
1877*p*	,,	,, ,, 1 JC 507	2·30	422·5
		2. *Old Forks.*		
———	London	Faraday's 2 C, 2 A *flat*, 2 E *flat*, 2 A	2·37	424·3
———	,,	,, 2 G	2·62	430·3
———	,,	,, 1 C and 2 E	2·67	431·7
———	,,	,, 1 C and 1 E	2·72	432·8
———	,,	,, 2 A	2·89	437·2
———	,,	Ellis's 2 A Philharmonic	,,	,,
———	,,	Bishop's 2 C, found in organ	3·01	440·4
———	,,	Ellis's 1 C Philharmonic	3·16	444·2
1715*c*	,,	Rev. Mr. Driffield's 4 A	2·19	419·9
,,	,,	Fork found buried at Brixton, 2 A	3·55	454·2
1751	,,	Handel's own Fork 2 A	2·30	422·5
1800*c*	,,	Broadwood's 1 C	2·31	422·7
,,	Plymouth	Dr. Stainer's 2 A	2·38	424·6
,,	London	Cavaillé-Coll's English 1 C	2·94	438·5
,,	,,	Broadwood's 1 C	2·33	423·6
,,	,,	,, 1 C	2·49	427·2
,,	,,	de la Fage's 2 A	2·50	427·5
1826*c*	,,	Broadwood's 1 C	2·50	427·5
,,	,,	,, 1 C	2·54	428·4
1846*c*	,,	Bryceson's 1 C	2·70	432·3
,,	,,	Ellis's 2 C	2·71	432·6
,,	,,	,, 1 C	2·75	433·7
1849*a*	,,	Irish Gentleman's 2 A Philharmonic	2·80	435·0
1878*a*	,,	Bishop's Walker's 1 C	3·32	448·1
,,	,,	Bishop's 1 C Philharmonic	3·45	451·7
		3. *Church Organs.*		
1625	Lavenham	Church Bell	2·65	431·3
1668*a*	London	Tomkins's rule	4·29	474·1
1660	,,	Whitehall, B. Schmidt's original?	,,	,,
———	,,	,, altered	3·08	441·7
1683	Durham	,, original Organ	4·29	474·1
1815*p*	,,	,, altered	3·12	443·1
1879*a*	,,	,, Willis's New Organ	3·18	444·7
1690	Hampton Ct.	B. Schmidt, Chapel Organ	3·08	442·0
,,	,,	,, Old Pipe	3·07	441·7
1708	London	,, St James's Chapel Royal, original	4·90	474·1
———	,,	,, altered, A 442, see under A 474·1	———	———
1759	Cambridge	,, Trin. Coll. after shifting	1·14	395·2
1683	Temple	,, see under A 422·5		
1879	,,	,, altered	3·17	444·3
1666	Worcester	T. and R. Harris, Cathedral	2·89	437·1
1670	Newcastle	R. Harris, St. Nicholas	2·55	428·7
1696	London	,, St. Andrew Undershaft	2·51	427·7
1700	,,	,, St. John's, Clerkenwell	2·15	419·0
1878*a*	Norwich	,, ? Cathedral	2·49	427·2
1744	Maidstone	Jordans's	2·89	437·4
1778	London	Green, St. Katharine's, Regent's-park	2·33	423·2
1780	Winchester	,, Restoration of College Organ	2·20	420·1
1788	Windsor	,, St. George's Chapel	2·51	427·8
1790	Kew	,, Parish Church	2·30	422·6
———	Dublin	,, Trinity Coll., restored (?)	2·87	436·8
1696	Boston, Linc.	Christian Smith, restored (?)	2·95	438·9
1749	London	Glyn & Parker, All Hallows the Great and Less	2·37	424·3
1730	Westminster	Schreider and Jordan's, Abbey original (?) see under A 474·1	———	———
1820*a*	,,	,, altered	2·30	422·5
1821	,,	,, altered for Greatorex to A 433·2, see under A 422·5	———	———
1848	,,	,, altered by Hill to A 441·7, see under A 422·5	———	———
1877	,,	,, present state	2·92	438·0
1740*p*	London	Schnetzler, German Chapel Royal	2·42	425·6
1764	Halifax	,, Parish Church	,,	,,
1740	Gr. Yarmouth	Byfield, Jordan, and Bridge, St. George's Chapel	2·44	425·9

Date.	Place.	Pitch.	S	A
		III.—ENGLAND, &c. (*Continued.*)		
		3. *Church Organs.*—(*Continued.*)		
1740	Gr. Yarmouth	Byfield, Jordan, and Bridge, Parish Church, restored (?)	2·91	437·7
1748	London	Jordans', St. George's, Botolph-lane	4·24	474·1
1830*c*	Belfast	Christchurch, restored (?)	2·75	433·6
,,	Arundel	Parish Church	2·82	435·6
1838	Bath	Smith, of Bristol, Abbey	2·30	422·5
———	Fulham	Jordans', Parish Church, altered (?)	2·62	430·4
1840*a*	Paddington	St. Mary's Chapel	2·95	439·0
1840*c*	Shrewsbury	Byfield and Green, St. Mary's, altered (?)	2·75	433·6
1843	Wimbledon	Walker, Parish Church	2·46	426·5
1855	Barking	Byfield and Green, restored by Walker (originally A 474·1)	2·98	439·5
———	Salisbury	St. Edmund's	3·14	443·7
———	London	St. George's-in-the-East	,,	,,
1877	,,	St. Paul's, present state	3·18	444·6
1878	,,	Bryceson, St. Michael's, Cornhill	3·57	454·7
———	Newcastle	Schulze's Tynedock	3·50	452·8
1879*a*	Salisbury	Willis, Cathedral	3·20	445·2
,,	Glasgow	,, Established Church Cathedral	,,	,,
,,	Edinburgh	,, Episcopalian Cathedral	,,	,,
1878	London	Bishop's Standard Pipe	2·84	436·0
,,	,,	Gray and Davison's ,,	3·00	440·0
,,	,,	Walker's ,,	3·01	440·2
,,	,,	Bevington's ,,	3·02	440·5
,,	,,	Lewis's ,,	3·04	441·0
,,	,,	Hill's ,,	3·07	441·7
,,	,,	Bryceson's ,,	3·13	443·4
,,	,,	Willis's Church ,,	3·20	445·2
1879	,,	Experimental Copy of R. Harris's B *natural* at All Hallows Barking, Great Tower-street	2·79	434·7
,,	,,	Experimental Copy of B. Schmidt's, Hampton-court, B *flat*	3·23	445·8
,,	,,	Narrow scale experimental B *natural* one-foot pipe	3·23	446·0
		4. *Concert Organs.*		
1867	London	Walker, Exeter-hall	3·23	445·8
1879	,,	,, ,, sharpened	3·28	447·3
1877	,,	,, Gloucester Festival	3·29	447·7
,,	Glasgow	Lewis, Public Halls	3·41	450·6
1877*a*	London	Willis, Concert Standard, Albert Hall, Alexandra Palace	3·54	453·9
,,	,,	Albert Hall, observed	3·58	455·1
,,	Sydenham	Gray and Davison, Crystal Palace	3·55	454·1
,,	London	Bryceson, band pitch	3·57	454·7
		5. *Opera.*		
———	London	Covent-garden, Costa's Fork, Allen's copy	3·52	453·4
———	,,	,, Collard's	3·57	454·7
1857	,,	Bettini's Fork of London Opera	3·62	456·1
1877	,,	Covent-garden, Harmonium	3·36	449·2
1878	,,	,, Organ	3·05	441·2
,,	,,	,, Harmonium	3·29	447·5
,,	,,	,, Band during performance	3·39	449·9
1879	,,	,, Organ	3·22	445·6
,,	,,	,, Band during performance	3·38	449·7
1880	,,	,, Theatre Fork for the Season of 1880	2·82	435·4
1878	,,	Her Majesty's, Organ	2·85	436·1
1879	,,	,, Band during performance	3·20	445·5
1880	,,	,, Theatre Fork	3·19	444·9
		6. *Concerts.*		
1813 —28	London	Philharmonic, copy of original Fork	2·35	423·7
,,	,,	,, another copy	2·33	423·3
1826	,,	Approved by Sir G. Smart 1 C	2·72	433·0
,,	,,	Sir G. Smart's own 2 A	2·73	433·2
1846 —54	,,	Mean of Philharmonic under Costa	3·49	452·5
1874	,,	Highest Philharmonic	3·57	454·7
1876	,,	Sold as Concert-pitch by Cramer	3·26	446·7
1877	Sydenham	Crystal Palace Band	3·55	454·1
,,	London	Wagner Festival at Albert-hall	3·58	455·1

Date.	Place.	Pitch.	S	A
		III.—ENGLAND, &c. (*Continued.*)		
		7. Pianos.		
1826	London	Broadwood's lowest, London No. 1 of Fr. Com.	2·72	433·0
1849 —54	"	" medium, original, London No. 2 of Fr. Com.	3·23	445·9
"	"	" copy now used	3·24	446·2
1860	"	" copy made for Society of Arts	3·21	445·5
1852 —74*a*	"	" highest, London No. 3 of Fr. Com.	3·49	452·5
1874*p*	"	" highest	3·57	454·7
1846*a*	"	Hipkins's Vocal (meantone)	2·74	433·5
1846*p*	"	" " (equal)	2·84	436·0
1877	"	Collard's Pitch	3·39	449·9
1879	"	Erard's Pitch	3·59	455·3
"	"	Steinway in England	3·57	454·7
1877	"	Chappell	3·62	455·9
		8. Military Music.		
1878	London	Dr. Stone's British Army Regulation Fork	3·46	451·9
"	"	Dr. Stone's Kneller-hall Training-school Fork	3·50	452·9
		IV.—FRANCE.		
		1. Standards.		
1648	Paris	One French foot pipe—Mersenne's	0·17	373·7
		" Dom Bédos's	0·31	376·6
1766	"	" Delezenne's	0·15	373·1
1854	"	Pitchpipe at Faculty of Sciences	1·78	410·0
1700*p*	"	De Prony's proposal	3·07	441·7
1832	"	Marloye's proposal	2·62	430·5
1834	"	Cavaillé-Coll's proposal	3·16	444·0
1858	"	French Commission's proposal	2·80	435·0
"	"	Diapason Normal at the Conservatoire; under this pitch see complete list of copies examined	2·82	435·4
1859	"			
		2. Old Forks.		
1700*c*	Lille	Old Fork, Mazingue's	0·66	384·3
1754	"	" François's	2·30	422·6
1800*c*	"	" Cohen's	2·55	428·7
1854*a*	"	" Delezenne's	2·72	432·9
1859*a*	"	" Marquis d'Aligre's	2·97	439·4
1810*c*	Paris	" Lemoine's	2·60	430·0
		3. Church Organs.		
1636	Paris	Mersenne's *ton de chapelle*	5·39	503·7
1700*a*	Lille	L'Hospice Comtesse	0·19	374·2
1789	Versailles	Palace Chapel, Conservatoire Fork	1·17	395·8
1818	Paris	Tuileries Chapel, "	2·78	434·3
1840	"	Cavaillé-Coll's St. Denis	3·17	444·3
1851*a*	Lille	St. Sauveur	0·69	384·6
1854*a*	"	La Madeleine (restored)	1·29	398·7
"	"	St. Maurice (repaired)	1·66	407·3
"	"	St. André "	2·69	432·2
1841	"	St. Etienne (rebuilt)	2·89	437·1
1854	"	St. Catherine (retuned)	3·02	440·5
		4. Concert Organ.		
1851	Lille	Festival Organ	3·27	446·8
		5. Opera.		
1810	Paris	Grand Opera, Drouet	2·32	423·0
1811	"	" Scheibler	2·48	427·0
1819	"	" Cagnard de la Tour	2·76	434·0
1822	"	" Fischer	2·67	431·7
1824	"	" lowered for Branchu	2·43	425·8
1829	"	" recovered Pitch	2·76	434·0
"	"	" Cagnard de la Tour	2·92	438·0
"	"	" Orchestral Pitch	3·00	440·0
1830	"	" Drouet	2·63	430·8
"	"	" "	2·80	435·8
1834*c*	"	" Scheibler's Petit-bout	2·76	434·0
1836	"	" Cagnard de la Tour	2·88	437·0
1836 —9	"	" Delezenne's Leibner	3·04	441·0
1854*a*	"	" " Forks	2·89	437·4
"	"	" " Pleyel	3·02	440·5
"	"	" " Reeds	3·32	448·3
855	"	" Lissajous & Ferraud	3·35	449·0

Date.	Place.	Pitch.	S	A
		IV.—FRANCE.—(*Continued.*)		
		5. Opera.—(Continued.)		
1856	Paris	Grand Opera, Pianoforte-makers' Fork	3·24	446·2
"	"	" Bodin's Fork	3·23	445·8
1858	"	" French Commission	3·31	448·0
1823	"	Italian Opera, Fischer	2·37	424·2
1829	"	" Cagnard de la Tour	2·80	435·0
1836	"	" " "	2·88	437·0
1854	"	" Delezenne's Reeds	3·10	442·5
1856	"	" Bodin	3·29	447·4
1820	"	Opéra Comique or Feydeau, Conservatoire	2·32	423·0
		" Fischer	2·50	427·6
1823	"	" Cagnard de la Tour	2·92	438·0
1829	"	" " "	2·92	441·0
1836	"	" " "	3·31	448·0
1854	"	" Delezenne's Reeds	3·12	443·6
1859	Bordeaux	Provincial Opera, Fr. Com.	3·40	450·5
1848 & 1854	Lille	" Delezenne	3·46	452·0
1859	"	" French Commission	3·31	448·0
"	Lyons	" " "	3·10	442·5
"	Toulouse	" " "		
		6. Concerts.		
1636	Paris	Mersenne, Ton de Chambre	7·26	563·1
1812	"	Conservatoire, Museum Fork	2·98	439·5
1834*a*	"	" Scheibler	2·82	435·3
"	"	" "	3·03	440·9
"	"	" Scheibler's Gand	2·82	435·2
"	"	" de la Fage	3·24	446·2
1856	"	De Prony (iron wire)	2·93	438·2
1815	"	" (brass wire)	3·18	444·5
"	"	Conservatoire, Fr. Com.	2·88	437·0
1859	Toulouse	" "	3·46	452·0
"	Lille	" "	3·27	447·0
"	Marseilles			
		7. Pianos, Spinets, &c.		
1648	Paris	Mersenne's Spinet	1·48	402·9
1713	"	Sauveur (see also A 407·1 and 408·0)	1·63	406·6
1783	"	Pascal Taskin	1·74	409·0
1829	"	Piano of Opera	2·42	425·5
1836	"	Wölfel's Pianos	3·13	443·3
1854*a*	"	Pleyel's Pianos	3·23	446·0
		V.—GERMANY.		
		1. Standards.		
1619	Brunswick	Praetorius's "Suitable Pitch"	2·37	424·2
1834	Stuttgardt	Scheibler's Pitch at the Congress of Physicists	3·01	440·2
		2. Old Forks.		
1740— 1812	Eutin	F. Anton von Weber's Fork	2·36	424·1
1780	Dresden	Kirsten's Fork	2·29	422·3
1800	———	Kummer's Fork	2·39	429·4
———	Hamburg	Schmahl's Fork, A 435·4 (see under A 489·2)		
		3. Church Organs.		
———	N. Germany	Praetorius (called by him *Chamber Pitch*)	7·40	567·3
1361	Saxony	Halberstadt Organ	5·41	505·8
1511	Heidelberg	Schlick, high Pitch	5·35	504·2
"	"	" low Pitch	0·33	377·0
1543	Hamburg	St. Catherine (taken 1879)	4·54	480·8
1615	Palatinate	Salomon de Caus	1·19	396·4
1645	Holstein	Glückstadt	3·50	453·0
1688	Hamburg	St. Jacobi, low stop, old Pitch	1·84	411·4
"	"	" high stops, old Pitch	4·84	489·2
1700*c*	Holstein	Rendsburg	5·06	495·5
1714	Saxony	Freiberg Cathedral, Silbermann	2·17	419·5
1716	Strassburg	See under A 376·6		
1722	Saxony	Dresden, St. Sophie	2·01	415·5
1749	Hamburg	Lehnert's Positiv	3·51	455·2
1754— 1824	Saxony	Dresden, chained fork of R.C. Church Organ	1·99	415·0
1760	Holstein	Rendsburg	5·06	495·5
1762	Hamburg	Mattheson's St. Michaelis	1·69	407·9
1833	Weimar	Töpfer's Pipe	2·37	424·4
1862	Saxony	Dresden, Orchestra of R.C. Church	2·36	424·0
"	"	the same in the theatre	2·50	427·5
"	"	R.C. Church Organ	2·12	418·1
1878	"	Cathedral, Old Organ	4·65	484·1
1879	Lübeck	St. Jacobi, Present Pitch	5·00	494·5
	Hamburg			

Date.	Place.	Pitch.	S	A
		V.—GERMANY.—(*Continued.*)		
		5. Opera.		
1752	Berlin	Marpurg, Fr. Com.	2·27	421·9
1806 —14	„	Wieprecht, Fr. Com.	2·62	430·5
1822	„	Fischer's Pichler's fork	2·89	437·3
1830	„	Wieprecht, Fr. Com.	3·00	440·0
1834	„	Scheibler "trustworthy"	3·07	441·8
1857	„	Taubert	3·33	448·4
1858	„	Wieprecht, Fr. Com.	3·42	450·8
1859	„	Fr. Com.	3·46	451·8
1861	„	Näke	3·45	451·5
1869	„	Sent to Society of Arts	2·82	435·5
1815 —21	Dresden	Näke's Fork of Weber's time	2·33	423·2
1826	„	Reissiger	2·80	435·0
1859	„	Fr. Com.	3·04	441·0
„	„	Näke, during performance	3·23	446·0
1862	„	Fürstenau's official Fork	2·91	437·8
1869	„	Sent to Society of Arts from Leipzig	2·95	438·9
„	„	Rietz's Fork (probably an error)	3·37	449·4
1878	„	Jehmlich's Fork	2·97	439·4
1859	Brunswick	Fr. Com.	2·78	443·5
1859	Carlsruhe	„	2·80	435·0
„	Gotha	„	3·13	443·3
„	Weimar	„	3·19	444·8
1859	Stuttgardt	Fr. Com.	3·12	443·0
„	Munich	„	3·32	448·1
1869	„	Sent to Society of Arts	2·85	436·1
„	Baden	„ „	2·78	434·5
„	Würtemburg	„	2·88	436·9
1879	Hamburg	Opera, under Krebs	3·31	448·0
		6. Concerts.		
1714	Saxony	Näke's presumed Chamber Pitch	0·24	375·2
	Hamburg	Old Orchestral Pitch	3·20	445·0
1859	Leipzig	Conservatoire, Fr. Com.	3·34	448·8
„	Würtemburg	Fr. Com.	3·19	444·8
1869	Leipzig	Gewandhaus, sent to Society of Arts	3·32	448·2
		9. Instruments.		
1776	Breslau	Marpurg	1·96	414·4
1760 —70	———	Flute by Floth (Näke)	2·12	418·0
1783	———	Grenser's Clarionet (Näke)	2·28	422·0
	———	Schneider's Oboe (Näke)	1·91	413·3
1800	———	Holtzapfel's Flute (Delezenne)	2·46	426·5
		VI.—HOLLAND.		
		3. Church Organs.		
		The old celebrated Church Organs have all been altered, and I have not succeeded in my attempts to recover their ancient pitch.		
		6. Concerts.		
1859	The Hague	Fr. Com.	3·34	446·2
		VII.—ITALY.		
		1. Standards.		
1720	Rome	Pitch-pipes (Dr. R. Smith)	1·14	395·2
1730c 1780c	Padua	Mean of Pitch-pipes of the Bell-foundry of Colbacchini	2·41	425·2
		2. Old Forks.		
1730c	Padua	Colbacchini's low 1 F	1·52	403·9
1780c	„	„ high 1 F	2·30	422·6
„	Verona	Cavedini's series of Forks	2·29	422·3
1790c	Padua	Stratico's 1 G	4·64	483·7
„	„	„ 4 G	2·87	436·6

Date.	Place.	Pitch.	S	A
		VII.—ITALY.—(*Continued.*)		
		5. Opera.		
1845	Florence	Marloye	2·87	436·7
„	Milan	„	3·26	446·6
„	Turin	„	2·99	439·9
1856	Milan	Fr. Com.	3·49	450·3
1857	„	La Scala (de la Fage)	3·45	451·7
„	Naples	San Carlo (Guillaume's Fork)	3·19	444·9
1859	Turin	Fr. Com.	3·19	444·8
		6. Concerts.		
1869	Bologna	Liceo Musicale	3·12	443·1
		7. Pianos.		
1839	„	Tadolini's Fork	2·43	425·8
		VIII.—RUSSIA.		
		3. Church Organs.		
1781	St. Petersburg	Euler	2·11	418·0
1860	„	Court Church	2·24	421·2
		5. Opera.		
1802	„	Sarti	2·84	436·0
1858	„	Fr. Com.	3·45	451·5
1869	„	Sent to Society of Arts	2·83	435·7
		9. Instruments.		
1739	„	Euler	1·00	392·2
		IX.—SPAIN.		
		3. Church Organs.		
1785	Seville	T. Bosch's Organ	2·18	419·6
1858	Madrid	Ton de Chapelle	2·18	419·6
		5. Operas.		
„	„	Theatre (in 1879, A 435·4)	3·18	444·5
		X.—UNITED STATES OF AMERICA.		
		7. Pianos.		
1879	New York	Steinway's Fork	3·66	457·2

DISCUSSION.

The Chairman said that no one could regret the time Mr. Ellis had taken, considering the great interest and importance of the subject, and the very thorough manner in which he had treated it. He could not expect any discussion upon the paper, because, though they were in the habit of discussing opinions, facts of this kind admitted of no discussion. Mr. Ellis had put all his facts on such good authority, that there was nothing to question —they could only receive them with humility as information of immense value. Indeed, he could hardly express his high opinion of the value of the paper. It was a monument of research which would be referred to in future ages as a credit to the musical science of the day. He would only ask the meeting to pass a vote of thanks to Mr. Ellis for his excellent communication.

The vote of thanks was passed unanimously, and the meeting adjourned.

IMPORTANT POSTSCRIPT, 1 May 1880.—Dr. Koenig describes his counting instrument (see p. 300, col. 2, l. 11) in Wiedemann's (late Poggendorff's) *Annalen*, 1880, pp. 394—417. By this instrument he obtains a new standard Ut$_4$ = V 256 at 20° C = 68° F, and discovers that his former standard Ut$_4$ gave V 256·1774 at 20° C = 68° F. Hence at 59° F = 15° C, to which my measurements of it refer, it would, on the assumption of a gain of V 1 in V 21000 for a loss of 1° F, give V 256·2872, and, on Dr. Koenig's experimental conclusion of a gain of V 1 in V 8943 for a loss of 1° C, that is, of a gain of V 1 in V 16097 for a loss of 1° F, it would give V 256·32. With these compare the mean measurement V 256·28, at 59° F, on p. 402, col. 1. Using his own rule, therefore, Dr. Koenig's V 451 in Appendix No. 10, would be V 451·565 at 59° F, which confirms what is there stated. Dr. Koenig also especially determined the French Diapason Normal at the Conservatoire at Paris to be V 435·45 at 59° F, almost identical with A 435·4 in Table I. It is most satisfactory to find this final close agreement of Dr. Koenig's, Prof. Mayer's, and Prof. McLeod's measures with my own taken by Scheibler's forks as counted on p. 300.

A. J. E.

APPENDIX.

1. *Introduction of Equal Temperament.* (App. to Art 4, p. 294, col. 2.)—In the "Mémoires concernant l'histoire, les sciences, les arts, les mœurs, les usages, &c., des Chinois, par les Missionnaires de Pe-kin," 1780, Paris, vol. 6, edited by the Abbé Rossier, author of a "Mémoire sur la musique des anciens," there is an approximate ancient calculation of the lengths of the pipes for the twelve *lu*, or notes of the scale (p. 105), which shows the use of equal temperament; and in part 2, fig. 18, the same are calculated out fully and accurately by a modern Chinese. It must be remembered, however, that the Chinese did not employ harmony. In Europe, neither Zarlino, 1562, nor Salinas, 1577, mentions equal temperament. But Mersenne, 1636, does, and gives the numbers correctly (Harm. Univ., Liv. 2, prop. xi., p. 132), and adds (*ibid* liv. 3, prop. xii., "Des Genres de la Musique") that equal temperament "est le plus usité et le plus commode, et que tous les praticiens avouent que la division de l'Octave en 12 démitons leur est plus facile pour toucher les instruments." Of the ease there is no doubt, of the customariness corroboration is required. Mersenne gives also the meantone temperament, and deduces all his systems from the relations of just intonation, taking them bodily from Salinas. Werckmeister recommended equal temperament, and Schnitger attemped to carry it out in North Germany, 1688 (see A 489·2). This was more than a merely isolated attempt, but it does not seem to have spread to other countries. Dr. Robert Smith, 1759, must have actually heard equal temperament, or he could not have spoken of it as "that inharmonious system of 12 hemitones," producing a "harmony extremely coarse and disagreeable" ("Harmonics," 2nd ed., pp. 166-7), Dom Bédos, 1766, must also have heard it when he rejected it as "harsh and less harmonious than the old tuning" (see A 376·6).

As regards the recent English introduction of equal temperament, Mr. James Broadwood, in the "New Monthly Magazine" for 1st September, 1811, proposed it, and gave the error of the Fifths as one-fortieth of a semitone, which was to him the smallest sensible interval. On 1st October, 1811, Mr. John Farey, sen., showed that this was too much (it is much more nearly one-fiftieth of a semitone, or accurately S 0·01954), and referred to the article Equal Temperament in Rees's Cyclopædia, whereupon, on 1 Nov., Mr. James Broadwood says, that he gave merely a practical method of producing equal temperament, "from its being in most general use, and because of the various systems it has been pronounced the best deserving that appellation by Haydn, Mozart, and other masters of harmony" (unfortunately he adds no references), and concludes by saying that he is "still of opinion . . . that mathematical speculations cannot be of any practical use in directing the tuning hammer." Mr. Hipkins has been at some pains to ascertain how far equal temperament was general at that time, and from him I have learnt what follows. Mr. Peppercorn, who tuned originally for the Philharmonic Concerts (see A 423·7, and additions in Appendix, No. 7), was concert-tuner at Broadwood's, and a great favourite of Mr. James Broadwood. His son writes to Mr. Hipkins, that his father "always tuned so that all keys can be played in, and neither he nor I (the son) ever held with making some keys sweet and others sour." Mr. Bailey, however, who succeeded Mr. Peppercorn as concert-tuner, and tuned Mr. James Broadwood's own piano at Lyne, his country house, used the meantone temperament to Mr. Hipkins's own knowledge, and no other. Not one of the old tuners Mr. Hipkins knew (and some had been favourite tuners of Mr. James Broadwood), tuned anything like equal temperament. Collard, the Wilkies, Challenger, Seymour, all tuned the meantone temperament, except that, like Arnold Schlick, 1511, they raised the G *sharp* somewhat to mitigate the *wolf* or disagreeable noise resulting from the use of the Fifth E *flat* G *sharp*, in place of E *flat* A *flat*. Hence, even Mr. James Broadwood did not succeed in introducing equal temperament permanently into his own establishment, and all tradition of it died out in his house long ago.

In 1812, Dr. Crotch ("Elements of Musical Composition," pp. 134-5) gives the proper figures for equal temperament, and shows how it arose, and that it made the Fifths too flat, and the major Thirds too sharp, adding "this will render all keys equally imperfect." But he says nothing to recommend it.

1840, Dr. Crotch had his own chamber organ tuned in equal temperament, as I am informed by Mr. E. J. Hopkins, of the Temple Church.

The rest of this history will be found on p. 295, col. 1, whence it appears that, though previously used by individuals, Equal Temperament for Pianos did not become a trade usage till 1844, and Equal Temperament for Organs, did not become a trade usage till 1854. Hence these are the real dates of the recognition of Equal Temperament as the regular English system of tuning.

2. *Comparison of Scheibler's, McLeod's, and Mayer's Measures.* (Appendix to Arts. 16 and 18, p. 299, col. 1, and p. 300, col. 1.)—The five first forks of the lower table on p. 300, col. 1, were measured for me both by Prof. McLeod, and Prof. Mayer, by their methods described in Arts. 15 and 16, with the greatest care, for which I am much indebted to them. The forks did not return to me from Prof. Mayer, in America, till after the reading of my paper. Before sending them to him I had compared each with several of Scheibler's and my own forks. For Prof. Mayer's method it is necessary to cement with shellac a very light metal point to the end of one prong, in order to scribe the wave-curve, and also to transmit the electric spark which marks the seconds. This additional weight, small as it is, ought to flatten the fork. Hence, after the forks were returned with the points on, I compared them afresh with each of the other forks, to discover the amount of flattening. In the case of three fine large forks this was scarcely sensible, for the Marloye fork, not at all, for the Conservatoire fork, a doubtful V ·02, for the Versailles fork, an equally doubtful V ·04. But the Feydeau fork had lost V ·09, and the Tuileries fork as much as V ·14, owing to some imperfection of construction. Making the corresponding corrections, the results of Prof. Mayer's measurements are given in the column "Mayer, E." below. Afterwards Prof. McLeod measured the forks with the points on, and then with the points off, each

fork remaining unmoved in the same vice for both measurements. It was thus discovered that the effect of the added points was very small indeed, and that the chief difference generally arose from some loss the forks had sustained in their journey to America and back, as shown below, the numbers being fractions of V.

Forks.	Cons.	Tuil.	Feyd.	Vers.	Marl.
Loss....	·0015	·165	·0205	·0285	·014
Points ..	·0475	·035	·022	·022	·021
Sums..	·049	·200	·0425	·0505	·035

Adding these sums to the values found by Prof. Mayer, we find his measurement of the forks in the condition in which they were when measured by Prof. McLeod and myself at 59° F. The results are given in the column "Mayer, McL."

Name of Fork.	M'Leod.	Ellis.	Mayer, E.	Mayer, McL.
Conservatoire ..	439·55	439·54	439·48	439·51
Tuileries.....	434·33	434·25	434·26	434·33
Feydeau	423·02	423·01	422·91	422·98
Versailles	395·83	395·79	395·77	395·78
Marloye	255·98	255·96	255·98	256·02

The extreme closeness of these results, obtained by such entirely different methods, proves indisputably that we can now measure pitch within one-tenth of a vibration in a second, and that my count of Scheibler's forks cannot be wrong to that extent, and hence that my present measures are probably equally correct.

The four forks of Koenig, measured by Prof. M'Leod and myself were not sent to America, but Prof. Mayer had an opportunity of measuring three of Koenig's Ut_3, one of which had been but recently purchased. Prof. M'Leod had also measured three others, and I, two. The following is the result of these ten different measurements.

Koenig's Ut_3. 1) Measured by Prof. M'Leod. His own forks, V 256·28, 256·31, Prof. Guthrie's forks, V 256·14, 256·17. 2) Measured by Prof. Mayer, three different forks, V 256·38, 256·34, 256·35. 3) Measured by myself, Prof. M'Leod's fork, as above, V 256·30; Dr. Spottiswoode's fork, V 256·23; a copy, made by myself, of Prof. Tyndall's fork before it was injured, frequently compared with the original, V 256·28. The mean of these 10 measures is V 256·28, which I have assumed as the probable mean value of Ut_3 on page 301, col. 2, Table.

(3.) *Compass of the Voice.* (Appendix to Art. 21 page 303, col. 2).—The following are the limiting notes of "the most sonorous compass of the seven different voices in most choral bodies," according to H. Berlioz ("Modern Instrumentation," Novello's edition, 1856, page 178), where, as it was printed before the French Diapason Normal was introduced, I assume Broadwood's mean pitch, as I did for Randegger. These limits should be contrasted with the inner, outer, and mean limits of my Tables in the text, and will be found wider than the first, but much narrower than the other two.

	From		To
First Soprano ..	2 C 265·3	....	1 B *flat* 945·4
Second Soprano..	4 B 250·6	....	1 G 795·0
Contralto	4 F 177·1	....	1 E *flat* 631·0
First Tenor	4 C 132·6	....	2 B *flat* 472·7
Second Tenor ..	4 C 132·6	....	2 G 397·5
Barytone or First Bass	8 B *flat* 118·2	....	2 F 354·2
Bass	4 F 88·6	....	2 E *flat* 315·5

Actual usage of composers. Handel, in his early "Acis and Galatea" (see article *Bass* in Grove's Dictionary), wrote a bass song from 8 C *sharp* to 2 A. In the bass parts of his "Messiah," Handel only once gives 8 F 84·5 (in "Lift up your heads"), rarely uses 8 G 94·7, but frequently has 8 A 105·6, and writes up to 2 E 315·9, but not often. In the "Hallelujah Chorus," he takes his sopranos to a long sustained 1 G 757·6, and his solo soprano in "Rejoice greatly," touches only in passing 1 A *flat* 789·8. In the "Seraglio," Osmin's song, "Ah! che voglio trionfare"), Mozart makes a bass sustain 8 D 70·6 for 8 (allegro) bars, and immediately jump up two octaves to 2 D 282·5. In the "Benedictus," of the 12th Mass, Mozart leads a bass voice by a chromatic scale from 4 C 126·3 down to 8 E 75·1, which cannot be escaped. In the "Magic Flute," he makes the "Queen of the Night" sing up to ½ F 1352·0, and in 1770 Mozart writes that he heard Lucrezia Agujari (La Bastardella) sing from 2 D 282·1 to ½ C 2017·2, "with a lovely voice." In "Robert le Diable," Meyerbeer once makes Bertram sing to 8 E 83·6 (taking his pitch to have been A 446·2, as is very possible), and in "Dinorah" makes a soprano sustain ½ C 1061·2, which Mad. A. Patti has often been forced to sing at ½ C 1070, and now objects to sing higher than ½ C 1035·6.

(4.) *Violin Resonance.* (Appendix to Art. 26, page 309, col. 2.)—Dr. Huggins thought his Stradivarius violin sounded better at present concert pitch, say A 454. Mr. Healey thought his old violin, supposed to be an Amati, sounded best at about Handel's pitch, or A 422·5. These are the very pitches corresponding to the two maximum resonances observed in the text. A violin by Maggini, of Brescia (1560-1640), belonging to Mr. Vernon Lushington's eldest daughter, and examined subsequently, had the same two maximum resonances, the higher being much the superior.

Appendix to Table 1.

(5.) *Russian Court Church.* (Insert on p. 319, col. 1 after A 420·1.) A 421·2, EC 500·9 (MC 503·9, JC 505·4), S 2·24, (Ellis.) 1860, Russia, Imperial Russian Court Church band.—This fork, a copy belonging formerly to Herr Näke, was lent to me by his widow. It was contained in the same box as Stein's fork, A 421·3, and was accidentally overlooked in drawing up Table I.

(6.) *Handel's Fork.* (Appendix to (1) A 422·5, page 319, col. 2, line 17 from bottom.)—Mr. Hipkins thinks that Mr. Reid was mistaken in supposing that the house of Broadwood ever owned Handel's fork. Mr. Hipkins supposes that Mr. Reid's mistake arose from Mr. Clarke having brought Handel's fork to Broadwood's in 1855 to show it, and also from the corresponding pitch of Peppercorn's fork (see Appendix No. 7, to A 423·7), which was in possession of that house.

(7.) *Original Pitch of the Philharmonic Concerts.* (Appendix to A 423·3 and A 423·7, p. 320, col. 2.)—The following is a copy of Mr. Peppercorn's certificate preserved at Messrs. Broadwoods' :—"This is to certify that I,

John Peppercorn, tuned for 15 years [1813-1828] at the Philharmonic Concerts, for Messrs. Broadwood and Sons, which is now nearly 30 years since, and that I have the same fork in my possession. It was given to me from the members of the Philharmonic Society, as the Pitch determined and settled by mutual consent. It is half a tone lower than the present Philharmonic Pitch. The Pitch given to me, Sir George Smart being in possession of a fork exactly the same, he always kept me exactly to it. This same Pitch, given to me by the members of the Philharmonic, agrees [with] Handel's Pitch, with the Pitch also of a fork shown to me by the late Mr. Jacobs, organist to the Rev. Rowland Hill's Chapel, which was about 30 years since, and his Father had been master to the Sons of the Clergy, about 70 years before. I was shown a *Mater Dei* Convent Bell, certainly 500 years old, with which this Pitch also agreed, as also with that of most of our Church Bells. 20th March, 1855. (Signed) Jno. Peppercorn. This pitch also agrees with an ancient fork and other forks in the possession of Mr. Black, at Messrs. Broadwood's. [See Table I., A 422·7, 423·6, 427·2, 427·5, 428·4.] The fork, shown at Messrs. Broadwood's as Sir George Smart's present pitch [see A 433] is nearly a quarter of a tone sharper than the one I now have [really S 0·37, more than a quarter of a tone], and certainly was not the pitch made use of at the Philharmonic Concerts when I tuned at them. (Signed) Jno. Peppercorn." With regard to church bells, see Colbacchini's pitch pipes, A 425·2, and Cavedini's fork, A 422·3, both from bell-founders, and both used to determine the pitch of bells. Mr. Lewis, the organ builder, found the famous old tenor bell at Lavenham (16½ miles W.N.W. of Ipswich), date 1625, meant to be and called D, to be 2 D 288·4, giving MA 431·3, which would be rather sharper than Harris's A 428·7 at Newcastle-upon-Tyne, and is interesting as occurring in the earliest days of mean pitch, and before English organs had been smashed by the Puritans, 1644-6.

(8.) *The Jordans's Maidstone Organ.* (Insert on p. 325, col. 1, after A 437·4). *(2) MA **437·4** (EA 440, JA 436), C 523·3, S 2·89. (Streatfield and Ellis.) 1744, Maidstone, old parish church. This organ was built by the Jordans, and in 1878 had this pitch, and was in mean tone temperament. On 25 March 1880, while the pipes were lying open, having been just returned by Lewis, who was rebuilding the organ and putting it in equal temperament, at his own pitch (see (4) A 441). I examined the marks on many pipes, and could find no sign of old shifting. The stopped diapason, least likely to be altered, but easily tunable by its long ears within the limits A 437 and A 442, was apparently quite unaltered, and I found the genuine old markings of the peculiar German *d* and *d* sharp, on the pipes which bore also Lewis's marks of D and D *sharp*. So there seems to be no doubt that the pitch has been preserved to this day. But as the Jordans also used the sharp pitch A 474·1 (which see) at St. George's, Botolph-lane, it follows that the Jordans as well as Bernard Schmidt, used two pitches, or made both A foot and B *flat* foot organs, corresponding to a church and a chamber pitch.

(9.) *Temple Church Organ.* (Insert after *A 444·3, page 327, col. 1), *(2) **444·3** measured, and also B *flat* 471·4, B 498·6, C 529 measured. (Ellis.) 1880, London, Temple Church organ, after it had been repaired and resettled in 1879, by Messrs. Forster and Andrews, of Hull.—The original organ was built by B. Schmidt probably at A 441·7, and was flattened by Mr. C. A. Bishop to A 433·2 (see notes on (1) A 422·5); it was afterwards reconstructed by Schulze in 1859, and he made the pitch so sharp that Messrs. Forster and Andrews had to shift the pipes a semitone, to bring it to this pitch. This would imply that Schulze's pitch was A 470·7, which is hardly likely (see A 452·8 in Appendix No. 11). The pipes were probably adjusted after shifting. To depress a quarter of a tone was found too little, as Mr. Forster said. Hence, after depressing a semitone, the pipes were possibly cut to sharpen them. The whole of Schulze's Hohlflöte stop as sent from Germany was too sharp, and had to be accommodated afterwards. The actual pitches measured above are not exactly in tune. Starting from A we should have had A 444·3 EB *flat* 470·7, EB 498·7, EC 528·4, and starting from measured C 529, we should have, EB 499·3, EB *flat* 471·3, EA 444·8.

(10.) *Belgian Army Military Instrument Pitch.* (Appendix to A 451, p. 329, col. 1, and A 455·5, p. 330, col. 1).—M. Victor Mahillon has had the kindness to send me the following. Before 16 December 1874, numerous standards for military music were in use in Belgium, occasioning extreme embarassment to manufacturers. The ministry, therefore, sent the several forks to M. Mahillon for the purpose of selecting the mean, and he, not having a tonometer, sent the selected mean to M. Koenig, in Paris, to measure, and to construct from it a large standard fork for future use. On the ministry being informed that the mean pitch was VS 902 = V 451, a ministerial decree was issued, dated as above, fixing this as the standard determined by Koenig's fork. Hence, as the copy I saw was A 451·7, either Koenig's measurement was slightly incorrect (which is very probable, see measurements of his Ut_3 in No. (2) in this Appendix, which would make his V 451 really 451·5, leaving only V ·2), or the large fork he made rose in pitch after tuning (which is very probable, a rise of V ·2 being quite common), or both (which is still more probable). From this standard M. Mahillon tuned Dr. Stone's copies by ear, but he sometimes makes copies by the optical process of Lissajous. That process was not used to determine the pitch, which was due to Koenig's measurements. Subsequently to the settlement of this standard, M. Dunkler (d. 1878), bandmaster of the regiments of Grenadiers and Chasseurs in Holland, succeeded in establishing A 451 as the Dutch standard for military music also. On 21 Dec. 1875, a Commission was appointed by Royal decree in Belgium to examine the possibility of establishing a uniform pitch in Belgium. Mons. F. A. Gevaert, Director of the Royal Conservatoire at Brussels, was president, and Mons. V. Mahillon secretary. The Commission recommended the adoption of the French Diapason Normal for military music as well as for the Conservatoire. This recommendation remains pigeon-holed on account of the great expense which the alteration of all military bands would entail, and hence there is at present no uniform Belgian standard. M. Victor Mahillon also says that the so-called fork of the Guides (see A 455·5), properly speaking, never existed. The pitch of A was occasionally given by M. Bender on a small clarinet, on which he played, and such a pitch is of course very uncertain. Mons. C. Mahillon, however, possessed a fork taken from it, which was at lowest A 456.

(11.) *Schulze's Tynedock Organ.* (Insert in Table I., after A 452·5, page 329, col. 1). EA **452·8** [MA 450·2, JA 448·8) C 538·5, S 3·50. (Chambers and Ellis.) 1880 (date of measurement), Tynedock Church Organ at Newcastle-on-Tyne, one of the finest built by Schulze in England, from a fork tuned to the open diapason expressly for me by Mr. Charles Chambers, Mus. B. This is practically in the mean Philharmonic pitch, A 452·5. Mr. Rea, formerly organist, found it best to transpose most music by a semitone, and therefore play at A 427·4, that is, practically at the pitch of Harris's organ, St. Nicholas Church, also at Newcastle, see A 428·7. For a similar pitch of Schulze's, see Temple Church Organ, in Appendix, No. 9.

(12.) *Barking Organ.* (Appendix to A 474·1, page 331, col. 2.) This organ (see (2) A 439·5) was probably one of these sharp A foot organs. Both B. Schmidt and Jordans, and hence probably other builders built both A foot and B *flat* foot organs. For Schmidt, see (1) A 441·7, in Table I., for the Jordans', see Maidstone organ, in Appendix, No. 8.

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DER URSPRUNG

DES

RÖMISCHEN KIRCHENGESANGES.

MUSIKGESCHICHTLICHE STUDIE

VON

FR. AUG. GEVAERT.

DEUTSCH VON **Dr. HUGO RIEMANN.**

(Vortrag, gehalten in der Sitzung der Belgischen Akademie der Künste in Gegenwart S. M. des Königs am 27. Okt. 1889, vermehrt mit Anmerkungen und einem Anhange.)

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VORWORT.

Vor keiner anderen Versammlung als der gegenwärtigen würde ich es wagen, ein so spezielles Thema zu behandeln. Aber in Gegenwart des erlauchten Protektors der Akademie, des hochherzigen Fürsten, dessen Sorge ebensowohl den ruhmreichsten Kulturleistungen wie der bescheidensten wissenschaftlichen Arbeit gilt, und im Kreise meiner hochangesehenen Collegen, der Vertreter der Wissenschaft, Litteratur und Kunst Belgiens, glaube ich auf eine ausnahmsweise Nachsicht und Geduld rechnen zu dürfen.

Wie könnte ich besser meine hohe Achtung gegenüber einer geneigten Zuhörerschaft bethätigen, als indem ich derselben die Früchte langjährigen Denkens vorlege? Der katholische Kirchengesang gehörte seit meiner Kindheit zu meinen Lieblingsstudien — bis zu meinem zehnten Jahre kannte ich keine andere Musik — und ich glaube, dass es mir geglückt ist, die Hauptphasen seiner Entwickelungsgeschichte genauer zu bestimmen, als dies bisher geschehen. Es sind also meine persönlichen Ansichten bezüglich der Uranfänge dieses Gesanges und ihrer Bedeutung für die allgemeine Geschichte der Kunst, welche ich bitte, Ihnen in aller Kürze vortragen zu dürfen.

Ich glaube die Bedeutung meines Gegenstandes nicht zu überschätzen, wenn ich sage, dass derselbe über die engen Schranken der musikalischen Fachgelehrsamkeit hinaus von Interesse ist und ein anziehendes Kapitel der allgemeinen Kulturgeschichte des Abendlandes bildet.

Die Tonkunst und die Baukunst — diese beiden jeder sesshaften Völkerschaft unentbehrlichen Künste — sind die einzigen deren Entwickelung nicht völlig aufgehört hat, während der dunklen Jahrhunderte, welche die Zeit des Römerreiches vom Mittelalter trennen. Und man kann weiter sagen, dass die flüchtigen Gebilde der Tonkunst eine grössere Widerstandsfähigkeit gegen die zerstörende Macht der Zeit gezeigt haben als die massivsten Bauwerke aus Stein oder Marmor. Der christliche Kirchengesang entsteht gerade in dem Moment, wo die geistige Schöpferkraft der griechisch-römischen Welt in Verfall geräth, und erreicht die höchste Stufe seiner Entwicklung zu einer Zeit, wo Kunstsinn und Wissenschaft im Abendlande einen Schlaf schlafen, der noch lange dauern soll. Wie das römische Volk und die ewige Stadt selbst, so hat auch die Musik des heidnischen Rom sich sozusagen von innen heraus umgebildet; langsam und unmerklich hat sie Sinn und Richtung gewechselt, bis sie eines Tages zum vollkommenen Ausdruck des christlichen Empfindens geworden war.

Das ist zunächst der wesentlichste historische Gesichtspunkt; was nun den musikalischen Werth jener alten Kirchenmelodien für den Künstler anlangt, dessen Blick über die Gegenwart hinausreicht, so ist es wohl nicht nöthig, an das Urtheil J. J. Rousseaus zu erinnern! Es handelt sich da keineswegs um historische Kuriositäten etwa wie bei der Musik fernabliegender Völker wie der Chinesen und Hindus, in der wir bizarren Rythmen und Melodien begegnen, die wohl manchmal pikant aber im Grunde doch unserer Empfindungsweise fremd sind. Die kirchlichen Melodien — welche durch den grössten Theil des Mittelalters hindurch alles waren, was unseren Vorfahren an Musik geboten wurde — sind sozusagen in unser Fleisch und Blut übergegangen und bilden einen Theil dessen, was man unsere musikalische Naturanlage nennen könnte. Sie reden eine wohl alterthümliche aber uns doch noch verständliche Sprache, die sich noch tagtäglich an ungezählten Punkten des Erdballs Gehör verschafft, und deren Accente die Schmerzen von tausend und abertausend Unglücklichen stillen.

Und merkwürdig — gerade die ältesten dieser Gesänge haben sich die grösste Wirkung gewahrt; so eine Melodie

aus dem 5. Jahrhundert wie z. B. das *Tedeum*[1]) wird noch immer mit ihrem grossartigen Ausdruck Massen ergreifen — trotz der mechanischen Vortragsweise der meisten unserer Kirchensänger —, während ein Meisterwerk der religiösen Kunst der Renaissance, das Stabat Mater von Palestrina, selbst bei vollkommenster Wiedergabe, für das grosse Publikum ein Buch mit sieben Siegeln bleibt und nur eine Minderheit höher Gebildeter anspricht. Das Fehlen jeder harmonischen Einkleidung, jedes sinnlichen Elements, trägt nur dazu bei, den Reiz jener alten Melodien vor dem Untergange zu bewahren. Von ihnen kann man sagen, was der geistreichste Kritiker unserer Zeit von den Versen Racines sagt: »Sie stehen ausserhalb der Zeit. Da sie unverhüllt sind, hat die Mode keine Macht über sie; und da sie von unvergänglichem Stoff gemacht sind, so altern sie nicht.«

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1) Zur Zeit des heil. Benedict, unter dem Gothenkönig Totila wurde dasselbe bereits beim Abendgottesdienst (Nokturn) des Sonntags gesungen: »Post quartum responsorium incipiat abbas hymnum *Te deum laudamus*«. *Vita et regula SS. P. Benedicti* cap. II. (Regensburg, bei Pustet, 1880, S. 25).

I.

Um mit Interesse der Geschichte der kirchlichen Gesänge folgen zu können, ist es unerlässlich, dieselben im Geiste in ihren ursprünglichen Rahmen zurückzuversetzen (die alte romanische Basilika), und sich diejenige Art ihrer Ausführung zu vergegenwärtigen, für welche sie zuerst erdacht sind.

Diejenigen Religionsübungen, bei denen die Musik die wichtigste Rolle spielt, sind die sogenannten »kirchlichen Tagzeiten« (Cursus ecclesiasticus). Hier macht das Absingen der Psalmen, Cantica und Hymnen, Tag und Nacht von der Gemeinde und ihrem geistlichen Leiter wiederholt (das Hora-Singen), das Wesen der Kultushandlung selbst aus. Im 6. Jahrhundert sehen wir diesen Theil des Kirchendienstes beinahe ebenso organisirt wie heute. Cassiodor (um 540) nennt sieben Synaxen oder tägliche Zusammenkünfte: den Mitternachtsdienst (*Vigiliae*, die jetzige Frühmette), die in drei Nachtwachen oder Nokturnen getheilt war und ausser dem Absingen von Psalmen noch Lektionen mit eingeschobenen Gesängen begriff; den Frühdienst um die Stunde des Hahnenschreies (*Gallicinium*, *Laudes matutinae*, die heutige »Laudes«), die drei »kleinen Tagzeiten« *Terz* (in der Mitte des Vormittags), *Sexte* (um Mittag) und *None* (in der Mitte des Nachmittags); den Abenddienst oder das *Lucernarium*, bei eintretender Dunkelheit, wenn die Lampen angezündet wurden (unsere heutigen Vespern) und endlich das *Completorium* vorm Schlafengehen[1]).

1) »Septies in die laudem tibi dixi . . . . Si ad litteram hunc numerum velimus advertere, septem illas significat vices, quibus se monachorum pia devotio consolatur, id est *Matutinis, Tertia, Sexta, Nona, Lucernario, Completorio, Nocturnis.*« *Expositio in Ps.* 118. (Ausg. Garet Bd. II S. 404). — Die Ordensregel des heil. Benedict welche um dieselbe Zeit festgestellt

In der Messe, der höchsten Kultushandlung der katholischen Kirche, hat der Gesang ebenfalls seit der ersten Organisation der Liturgie eine ausgedehnte Verwendung gefunden, aber doch in zweiter Linie. Er begleitet die heilige Handlung, ist aber kein wesentlicher Bestandtheil derselben. Das gilt besonders für die fünf Gesangssätze, deren Text und Melodie von Tag zu Tag wechselt: den Mess-Eingang oder *Introitus;* das *Graduale*, nach der Verlesung der Epistel (ein Sologesang, der zum Teil vom Chor wiederholt wird, und dem sich unmittelbar das *Halleluja* oder an Tagen der Trauer ein gedehnter Klagegesang, der *Tractus* anschliesst); ferner das vom Chor gesungene *Offertorium* und zum Schluss der Messe der Chorgesang der *Communion*[1]).

Abgesehen von den alltäglichen Messgesängen und einigen anderen Stücken von besonderem Zuschnitt, weisen die Melodien des römischen Kirchengesangs wenig Abweichung in ihrem musikalischen Bau auf. Alle diejenigen, welche bis hinter die Zeit Karls d. Gr. zurückreichen — mit denen allein wir uns beschäftigen werden — kann man in drei Klassen theilen. Die erste Klasse sind *Hymnen in Versen*,

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wurde, schreibt ausserdem (Kap. 16) noch als weitere Hora die *Prim* vor: »Septenarius sacratus numerus a nobis sic implebitur, si *matutino, primae, tertiae, sextae, nonae, vesperae, completoriique* tempore nostrae servitutis officia persolvamus, quia de his horis dixit: *Septies in die laudem tibi dixi;* nam de *nocturnis vigiliis* idem ipsa propheta ait: *Media nocte surgebam ad confitendum tibi*«. Bis zur Zeit Karls d. Gr. wurden Prim und Kompletorium nur in Klostergemeinden gesungen; das von den Benedictinern in der Sammlung der Werke des h. Gregor herausgegebene *Responsale gregorianum* enthält keine einzige Antiphon und kein einziges Responsorium für diese beiden Tagzeiten. Die ersten Vespern waren zu Anfang des 9. Jahrhunderts ebenfalls erst neu angeordnet, wie man aus folgendem Passus bei Amalarius »*De ordine Antiphonarii*« Kap. 16 (S. 1043) ersieht: »Inveni rationabilius inventum esse cultum solemnitatum vespertinalium apud scriptores antiquos, qui antiphonas scripserunt, quam apud cantores modernos. Adhuc solent dicere, interrogati de vespertinali synaxi, *Benedictus Dominus Deus meus* (Sabb. ad vesp.) pertinere illam ad diem Dominicam. Si enim voluissent intendere quod psalmi hujus vesperi in fine psalmorum vespertinalium essent positi nunquam hoc dicerent: quoniam ille qui psalmos vespertinales constituit, procul dubio a Dominica die coepit initium psalmorum vespertinalium componere, et non a fine hebdomadis«. Der eigentliche Anfang des Gottesdienstes für einen Wochentag oder irgend ein Fest ist das *Invitatorium*, mit welchem die erste Nocturne anhebt.

1) Abbé Duchesne, »*Origines du culte chrétien*«. Paris, Thorin 1889, S. 153 f.

deren Text wie der moderner Lieder in Strophen abgetheilt ist, und deren Melodien anfänglich strenge rhythmische Messung hatten. Diese Art von Gesängen ist sehr alt, aber durchaus abendländischen Ursprungs. In die Liturgie Roms selbst ward sie nicht vor dem elften Jahrhundert aufgenommen. — Die zweite Klasse begreift den *antiphonen Psalmengesang*, den Wechselgesang zweier Chöre. Der Gesammtchor ist dabei in zwei Teile geschieden, deren jeder je einen Psalmenvers singt. Dem Psalm geht eine kurze Melodie, die Antiphon, voraus, welche der Vorsänger intonirt, um den Psalmenton anzudeuten, in welchem gesungen werden soll, und welche nach dem Psalm vom Chor als musikalischer Abschluss des Stücks wiederholt wird. — Die dritte Klasse, deren rudimentären Typus die Litanei aufweist, umfasst die *Responsorialgesänge*, die Stücke mit Reprisen. Ursprünglich wurde der Text des Responsoriums stets von einem Diakonus allein vorgetragen, und der Chor der Gläubigen wiederholte die Schlussphrase der Melodie als eine Art Refrain.

Die Hymnen, Antiphonen und Responsorien treten in dem Gesammtschatz der Melodien der römisch-katholischen Kirche in zweierlei sehr unterschiedenen Formen auf: entweder sind sie *einfache Melodien*, mit nur einem Ton für jede Silbe oder doch beinahe so; oder ihr Text verbindet sich mit einer *ausgezierten Melodie*, mit eingestreuten Melismen. Die einfachen Antiphonen sind für die Offizien der Tagzeiten (Horen) feststehend; die verzierten Antiphonen eignen zweien der veränderlichen Gesänge der Messe: Introitus und Kommunion[1]). Was die syllabischen (d. h. auf jede Silbe gewöhnlich nur einen Ton bringenden) Responsorien anlangt, so hat der römische Ritus dieselben nur für die drei kleinen Tagzeiten erhalten; die Responsorien der Nachtzeiten (Vespern, Kompletorien und Laudes), desgleichen die Responsorialgesänge der Messe (Graduale, Halleluja und Offertorium) gehören dem verzierten Stile[2]) an. In den beiden zwischen Epistel

1) In einem Antiphonar aus dem 10. Jahrhundert (MS. zu St. Gallen), welches z. Z. die Benedictiner von Solesmes in phototypischer Nachbildung herausgeben (*Paléographie musicale*) findet sich keine Spur eines Psalmengesangs nach der Antiphon der Kommunion.

2) Die Offertorien haben in dem oben erwähnten Antiphonar noch ihre Versette, während sie im 11. Jahrhundert dieselben nicht mehr haben. Vgl. die Facsimiles der Trierer Manuscripte in Hermesdorffs Caecilia 1872 f. — Ein

und Evangelium eingeschobenen Sätzen (Graduale mit Halleluja oder Graduale mit Tractus) überwiegt stärker als in allen anderen Gesängen des katholischen Kultus das eigentliche musikalische Element. Sie bilden eine Art musikalisches Intermezzo für Solo und Chor, bei welchem der Vorsänger Gelegenheit hatte, seine Stimmmittel und seine Kunstfertigkeit zur Geltung zu bringen[1]).

Allen verzierten Melodien sieht man auf den ersten Blick an, dass sie später als die anderen komponirt sind. Dieselben setzen geschulte Sänger voraus und weisen daher auf eine Zeit hin, wo die päpstliche Sängerschule längst an die Stelle der Gemeinde der Gläubigen getreten war. Übrigens führt eine nur einigermassen aufmerksame Prüfung dieser Stücke zur Entdeckung offenbarer Erweiterungen (Ausschmückungen) einfacher Antiphonenmelodien und Psalmenintonationen.[2])

Der Gesammtbestand der liturgischen Gesänge der römischen Kirche, das *Antiphonarium Romanum*, bildet eine Sammlung von mehreren hundert Gesangsstücken, auch wenn man von den seit dem 10. Jahrhundert hinzugekommenen Offizien absieht. Dieser gewaltige musikalische Schatz, von welchem man heute nur einen geringen Theil mehr zu hören bekommt (ausgenommen bei einigen Mönchsorden), scheidet sich in zwei Specialsammlungen: das eigentliche Antiphonar, welches die Gesänge der Tagzeiten enthält, und das Graduale, welches die wechselnden Sätze der Messe begreift. [3])

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einziges Offertorium, das der Todtenmesse (des Requiem). *Domine Jesu Christe*, hat sich vollständig gehalten bis heute.

1) Der Tractus ist stets ein Sologesang. Amalarius »*De ecclesiasticis officiis* II. 12 (S. 986): »Hoc differt inter *responsorium* [gradale], cui chorus respondet, et *tractum*, cui nemo, quod est inter duo sacrificia« u. s. w.

2) Man vergleiche z. B. die Introiten »*Puer natus est nobis*«, »*Dum medium silentium*«, »*Viri Galilaei*«, desgleichen die Responsorien »*Dominus veniet*«, »*Canite tuba in Sion*«, »*O vos omnes*« mit den entsprechenden Antiphonen. Die Melodie des Versetts des Responsoriums (ausgenommen im 4. und 6. Ton) ist nichts weiter als eine sehr reiche Variirung der üblichen Psalmodie.

3) Der *Antiphonarius Gregorianus* ist also nach heutiger Ausdrucksweise ein Graduale und das *Responsale Gregorianum* entspricht dem heutigen Antiphonar. — Das St. Gallener Manuscript, welches Lambillotte (der es in lithographirter Faksimilirung herausgab) für eine Kopie des Antiphonars des h. Gregor hielt, ist ganz einfach ein Cantatorium (Amalarius, *De ord. Antiph.*, Vorwort), d. h. das Buch eines Solosängers: es enthält nur die Gradualien, Halleluja und Tractus.

II.

Wir kommen nun zur Frage der Zeitbestimmung. Da müssen wir uns erst über einige Hauptpunkte verständigen, von denen aus sich die Epoche der Entstehung der alten kirchlichen Kunst, der Hauptgegenstand unserer Untersuchung, leichter begrenzen lassen wird.

Um die äusserste Grenze dieser Epoche nach rückwärts festzustellen, ist der Versuch, bis auf die Regierungszeit Kaiser Konstantins zurückzugehen, nutzlos. Über die Formen der Liturgie in den vier ersten Jahrhunderten des Christenthums wissen wir beinahe nichts; und noch viel weniger weiss man, wie die Gesänge beschaffen waren, welche damals bei der Ausübung des Gottesdienstes zur Anwendung kamen. Ausgenommen vielleicht die Gesangsweise der *Präfation* mit dem an sie anschliessenden Chorsatz, dem *Sanctus*, und einige syllabisch komponirte Melodien ambrosianischer Hymnen scheint keins der im heutigen Ritus erhaltenen Gesangsstücke aus dem 4. Jahrhundert herzurühren. Immerhin aber erkennt man doch so viel klar, dass der Orient dem Abendlande in der Organisierung des liturgischen Gesanges vorangegangen ist. Seit der ersten Hälfte des vierten Jahrhunderts besass die syrische Kirche, besonders ihre alte Metropole Antiochia, die Wiege des Christenthums, angestellte Sänger[1]), zu einer Zeit, wo in Rom diese

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1) Kanon 15 des Konzils von Laodicea, um die Mitte des 4. Jahrhunderts (die genaue Zeitbestimmung ist strittig): »Quod non oportet amplius praeter eos qui regulariter cantores existunt, qui et de codice

Seite des Gottesdienstes noch ganz unentwickelt war. Wir werden den Einfluss dieser syrischen — halb griechischen, halb semitischen — Kirche auf die Entwickelung des römischen Kirchengesangs auch in späteren Epochen zu konstatieren haben.

Die älteste uns bekannte Notiz, über das erste Auftreten des Kirchengesangs in Rom findet sich im *Liber pontificalis*, der berühmten Chronik der Päpste, die eine so gediegene Ausgabe durch den Abbé Duchesne erfahren hat[1]). Wir ersehen da, dass der heilige Cölestin (Papst 422—432) den Psalmen-Wechselgesang[2]) in den Gottesdienst einführte, eine Singweise, die um die Mitte des 4. Jahrhunderts in Antiochia[3]) aufgekommen und in Mailand schon etwa seit 40 Jahren angenommen war, auf Veranlassung des h. Ambrosius[4]), des

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canunt, alios in pulpitum conscendere et in ecclesia psallere« Labbé, *SS. Concilia*, Paris 1671, Bd. 1, S. 1497 u. 1511. — Wie aus einem Briefe des Sidonius Apollinaris v. J. 468 (*Ep. XXII*, Ausg. Firmin Didot S. 69) zu ersehen, verwandte man in manchen Kirchen Italiens, besonders zu Ravenna, im 5. Jahrhundert syrische Sänger »In qua palude . . . natant sepulti, vigilant fures, dormiunt potestates, foenerantur clerici, *Syri psallunt*, negotiatores militant« u. s. w.

1) Paris, Ernest Morin 1886 (die Veröffentlichung ist noch nicht ganz zu Ende gediehen). Dies Dokument hat wirklichen historischen Werth erst vom Pontifikat des Hormisdas ab (514—523), zu dessen Zeit alle weiter zurückreichenden Biographien abgefasst wurden.

2) »Hic constituit ut psalmi David CL ante sacrificium psalli *antiphonatim* ex omnibus, quod ante non fiebat«. Bd. I, S. 230 und Anm. 1 S. 231.

3) »Flavianus et Diodorus, monachicam quidem amplectentes vitam, clare autem pro apostolicis dogmatibus laborantes, episcopi Antiocheni Leontii redarguerunt..... Isti namque primi *in duas partes choros psallentium dividentes* ex successione Davidicam melodiam cantare docuerunt. Et hoc in Antiochia primitus fieri coepit et dispersum ad terminos totius orbis pervenit«. Theodoret bei Cassiodor, *Historia eccl. tripart.* Lib. V, Cap. 33 (Ausg. Garet S. 250). Leontius hatte den Bischofssitz zu Antiochia 348—357 inne.

4) St. Augustin, in seinen *Confessiones* erzählt den Hergang mit der Jahrzahl 386: »Cum Justina, Valentiniani regis pueri mater, hominem tuum Ambrosium persequeretur, haeresis suae causa . . . excubebat pia plebs in ecclesia. Tunc hymni et psalmi ut canerentur secundum morem orientalium partium, ne populus moeroris taedio contabesceret, institutum est, et ex illo in hodiernum retentum, multis jam ac paene omnibus gregibus tuis et per caeteras orbis partes imitantibus«. L. IX c. 7. — »Apud Latinos primus idem beatissimus Ambrosius *antiphonas* constituit, Graecorum

Verfassers der ältesten echten Hymnen der abendländischen Kirche.[1])

Über den Ursprung der Responsorialgesänge haben wir keinerlei ähnlichen Aufschluss; doch scheinen dieselben nicht jünger zu sein als die Antiphonen der römischen Liturgie. Zu Beginn des 7. Jahrhunderts schreibt der Bischof Isidor von Sevilla: »Die Antiphonen sind aus griechischen Ländern herüber gekommen; die Responsorien sind vor langer Zeit in Italien aufgebracht worden«.[2])

Wir müssen daher die Periode musikalischer Produktivität, welche das römische Antiphonar entstehen liess, etwa vom Jahre 425 ab datieren.

Etwas schwieriger wird es sein, annähernd genau die Zeit zu bestimmen, wann die Kompositionsarbeit zum Abschluss kam, da die letztere Zeitbestimmung durch Jahrhunderte alte Tradition verschoben worden ist. Um mit Sicherheit und Methode vorwärts zu kommen, werden wir einigermassen einen Umweg machen müssen, indem wir uns gleich ins 9. Jahrhundert versetzen, wo wir einige Schriftsteller — die ältesten über diesen Gegenstand — vorfinden, die uns den römischen Kirchengesang in der Gestalt zeigen, die er bis heute

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exemplum imitatus«. Isidorus Hisp. *Eccl. offic.* L. I c. 7. — Vor Einführung des Psalmen-Wechselgesangs wurden die Offizien der Tagzeiten wahrscheinlich nur in jener halb recitirenden Art (*Cantus directaneus*) vorgetragen, deren man sich für andere Theile der Liturgie bedient (Episteln, Evangelien, Kollecten, Lektionen u. s. w.). St. Augustin beschreibt so die Manier, wie der h. Athanasius zu Alexandria die Psalmen singen liess: »Tam modico flexu vocis faciebat sonare lectorem psalmi ut pronuntianti vicinior esset quam canenti« *Conf.* L. X. c. 33. Vgl. Isidorus Hisp. *Eccl. off.* — Die Ordensregel des h. Benedict ermächtigt zum Palmengesang *in directo* (d. h. nur mit gesteigertem Tonfall der Rede) für die kleinen Tagzeiten, wenn die Zuhörerschaft eine nur wenig zahlreiche ist. (Kap. 17, S. 25). — Manche Klosterbrüderschaften singen die Offizien noch heute so.

1) Um die Mitte des 4. Jahrhunderts hatte der h. Hilarius, Bischof von Poitiers, bereits lateinische Hymnen componirt, doch scheinen dieselben verloren gegangen zu sein; die ihm zugeschriebenen sind apokryph. Dasselbe ist der Fall mit denjenigen Hymnen, die den Namen des Papstes Damasus (366—384) tragen.

2) »*Antiphonas* Graeci primum composuerunt. — *Responsoria* ab Italis longo ante tempore sunt reperta: et vocata hoc nomine, quod uno canente chorus consonando respondeat. Ante autem id solus quisque agebat; nunc unus interdum, interdum duo vel tres communiter, choro in plurimis respondente«. *Eccl. off.* L. I c. 7 u. 8. Vgl. *Etymolog.* L. VI c. 19.

bewahrt hat. Der erste derselben, Amalarius, Diakonus von Metz unter Ludwig dem Frommen, beschäftigt sich hauptsächlich mit den Texten der Gesänge;[1]) ein zweiter, Aurelianus, Mönch im Kloster Réomé in der Champagne um 850, klassifizirt die Melodien nach der Ordnung der acht Kirchentöne.[2]) Ein dritter, Regino, Abt des Klosters Prüm in der Diözese Trier gegen Ende des Jahrhunderts, giebt uns in seinem kostbaren Tonarius einen sehr ausführlichen Katalog von Antiphonen und Responsorien mit beigefügten Neumennotierungen;[3]) der letzte endlich, den unser Land (Belgien) seinen Sohn nennt, Hucbald von Saint-Amand, bespricht in einem Traktat, dessen Autorschaft ihm, wie es scheint, nicht bestritten werden kann, in eingehendster Weise eine Menge liturgischer Melodien.[4])

Aber um die Zeit, wo diese alten Autoren schreiben, ist der Kirchengesang normiert und schon durch lange Gewöhnung sanktionirt; man besitzt seit mehreren Generationen ein officielles Antiphonarium, das übereinstimmt mit dem Ritus, wie er sich in Rom festgestellt hat. Um die älteste Erwähnung einer Sammlung solcher Art zu finden, müssen wir zurückgehen bis auf die Mitte des vorausgehenden Jahrhunderts. Um 760 schickt der Papst Paul I. dem Könige Pipin von Franken, dem Wohlthäter und Beschützer der Kirche, »ein *Antiphonale* und ein *Responsale*«.[5]) Weiter zurück tasten wir ins Leere. Kein authentisches Dokument, kein zeitgenössisches Zeugniss giebt die Epoche an, in welcher das Antiphonar re-

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1) Amalarii Fortunati Metensis Diaconi, ad Ludovicum Pium Imperatorem, *De ecclesiasticis officiis libri IV; De ordine Antiphonarii liber*, im 14. Bande der Maxima bibliotheca veterum Patrum (Lyon 1677).

2) Aureliani Reomensis *Musica disciplina* bei Gerbert, *Scriptores* I, S. 27.

3) Reginonis Prumiensis *Tonarius*, bei Coussemaker *Scriptores* II, S. 1 ff. (Facsimile).

4) Hucbaldi monachi Elnonensis *Opuscula de musica* bei Gerbert *Scriptores*, I, S. 103 ff. Es ist schwer, sicher zu unterscheiden was von dem Misch-Masch (salmigondis), den der gelehrte Abt unter Hucbalds Namen veröffentlichte, wirklich dem Mönch von St. Amand mit Recht zugehört. Jedenfalls muss ihm die *Musica Enchiriadis* (S. 152 ff.) abgesprochen werden, wahrscheinlich auch die *Commemoratio brevis de tonis et psalmis modulandis;* doch lässt man ihm bis jetzt die uns hier interessirenden Schriften, nämlich diejenigen, in welchen die sogenannte Dasia-Notation nicht vorkommt.

5) Jaffé, *Regesta Pontificum Romanorum*, 2. Aufl. Leipzig 1881, No. 2351.

digirt wurde und die Arbeit der musikalischen Komposition seiner Gesänge als abgeschlossen erachtet werden kann.

Doch ist hier wohl zu beachten, dass es zur Zeit Karls d. Gr. liturgische Bücher, darunter ein Missale oder Sacramentarium und wahrscheinlich auch ein Antiphonarium, giebt, welche »*gregorianisch*« genannt werden.[1]) Ohne Zweifel ist das der Grund, weshalb im 9. Jahrhundert die Meinung aufkam, man verdanke die Organisation des Kirchengesangs dem den Beinamen des *Grossen* tragenden heil. *Gregor*, dem *ersten* und berühmtesten der drei Päpste des Namens Gregor, welche vor dem Erscheinen der fränkischen Monarchen in Rom den Stuhl Petri innegehabt hatten. [2]) In seiner Geschichte des Lebens und der Wunder des h. Gregor erzählt der Benediktinermönch Johannes Diakonus (um 882) dass der grosse Papst das Antiphonar zusammengestellt und die päpstliche Sängerschule, die berühmte *Schola cantorum* gegründet habe, ja dass er selbst sich damit befasst habe, Kinder im Singen zu unterweisen. Der gute Mönch versichert, dass noch zu seiner Zeit zu Rom das Ruhepolster gezeigt wurde, auf welchem der heilige Pontifex sich während der Unterrichtsstunden niederliess, sowie die Ruthe, mit welcher er die unaufmerksamen Schüler bedrohte.[3]) Obgleich diese Erzählung seit 1000 Jahren fast einhellig geglaubt worden ist, so wage ich doch, sie in Zweifel zu ziehen, und werde die Gründe aufzählen, auf welchen meine Ungläubigkeit basiert.

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1) Brief des Papstes Hadrian an Karl d. Gr., bei Jaffé No. 2473. — »Auctor Missalis *qui vocatur gregorialis* et Antiphonarii nos tangit ut recolamus nativitatem Domini celebratam per tres ordines librorum« u. s. w. Amalarius *De eccl. off.* Kap. 40 (S. 1000).

2) Walafrid Strabo (unter Ludwig dem Frommen) spricht über die Sache in unbestimmter Form: »Ordinem cantilenae, diurnis seu nocturnis horis dicendae B. Gregorius plenaria *creditur* ordinatione distribuisse, sicut et supra de Sacramentorum diximus libro«. *De rebus ecclesiasticis* Kap. 25 (i. d. *Max bibl. vet. Patrum* Bd. 15, S. 195).

3) *Antiphonarium centonem* cantorum studiosissimus nimis utiliter compilavit; *scholam* quoque *cantorum*, quae hactenus iisdem institutionibus in sancta Romana Ecclesia modulatur, constituit: eique cum nonnullis praediis duo habitacula, scilicet alterum sub gradibus basilicae B. Petri apostoli, alterum vero sub Lateranensis patriarchii domibus fabricavit: ubi usque hodie lectus ejus in quo recubans modulabatur et flagellum ipsius quo pueris minabatur, veneratione congrua *cum authentico Antiphonario* reservatur« *Vita S. Gregorii Magni* Lib. II cap. 6, bei Mabillon, *Acta Sanctorum ordinis S. Benedicti* (Paris, Billaine, 1668 Bd. I S. 415).

Erster Einwand. Die Berichte des Johannes Diakonus werden durch kein einziges älteres Dokument bestätigt. Weder die Grabschrift Gregors I., noch die Notiz des *Liber pontificalis*, noch irgend einer der alten Biographen und Panegyriker des Heiligen — Isidor von Sevilla, sein Zeitgenosse; Beda Venerabilis, im folgenden Jahrhundert; Paul Warnefried unter Karl d. Gr.[1]) — weiss irgend etwas von den Dingen, die Johannes Diakonus erzählt; ein Stillschweigen, das um so bedeutsamer ist bei Isidor und Beda, da beide Musikschriftsteller sind und sich viel mit der Liturgie beschäftigen.

Zweiter Einwand. Der h. Gregor ist derjenige Papst, von welchem uns die meisten Schriften erhalten sind.[2]) Er hat uns nicht allein eine grosse Menge theologischer Abhandlungen und Homilien hinterlassen, sondern auch eine Korrespondenz, die über 800 Briefe enthält und das ganze Bereich seiner öffentlichen und privaten Thätigkeit während seines 13 1/2jährigen Pontifikats umfasst. Ich wüsste aber nicht, dass man in dieser Masse von Schriften bis jetzt auch nur eine Zeile gefunden hätte, in welcher auf Arbeiten oder Beschäftigungen betreffs des Kirchengesangs hingedeutet wäre. Für jeden, der ohne vorgefasste Meinung die schriftstellerischen Werke Gregors I. prüft, ist es klar ersichtlich, dass der grosse Papst kein direktes Interesse für den musikalischen Theil des Kultus hegte.[3]) Einmal freilich hatte er sich mit demselben zu beschäftigen, aber in ganz anderer Richtung als die Tradition es uns darstellt. Man höre, wie er in einem Dekret der Synode von

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1) Isidor. Hisp. *De scriptoribus ecclesiasticis* Kap. 27. — *De viris illustribus* Kap. 2. — Bedae Venerabilis *Historia ecclesiastica gentis Anglorum* 2. Buch, Kap. 1. (Ausg. Stevenson, London 1838 S. 155). — Pauli Diaconi *Vita S. Gregorii* (i. d. Acta SS. ord. S. Benedicti Bd. I S. 385).

2) In der Ausgabe der Benediktiner von St. Maur (*S. Gregorii opera omnia*, Paris, Rigaud, 1705) drei starke Foliobände.

3) Ich weiss nicht, woraufhin man dem h. Gregor die Komposition der Hymnen *Lucis creator optime*, *Audi benigne conditor* u. a. zuschreibt. Alle Welt weiss, dass die lokale Liturgie Roms diese Kategorie von Gesängen gar nicht zuliess, weder im 6. Jahrhundert, noch viel später. Der grosse Papst, dem nicht nur das oberste Kirchenregiment oblag, sondern der auch noch dazu die Bürde schwieriger politischer Verhältnisse zu tragen hatte während der schlimmsten Schreckensjahre, die Rom in seiner langen Geschichte durchgemacht hat, — er hatte schwerlich die Musse, als Hymnendichter zu dilettieren und den Gesanglehrer der Chorknaben zu spielen.

595 spricht: »In dieser heiligen römischen Kirche, deren Leitung die Vorsehung mir anvertraut hat, ist seit lange eine tadelnswerthe Gewohnheit aufgekommen. Man erwählt für den geistlichen Dienst Sänger, welche, sobald sie zum Rang der Diakonen befördert worden, sich einzig und allein mehr mit ihrer Stimme beschäftigen, während es ihnen doch obläge, des Predigerdienstes und der Armenpflege zu walten. So kommt es oft, dass der Priester, der nur die Schönheit seines Organs im Auge hat, versäumt, ein erbauliches Leben zu suchen, und Gott durch seine Aufführung beleidigt, während er das Volk durch seinen Gesang ergötzt. Deshalb verordne ich hiermit, dass im Bereich meiner Jurisdiktion die Diener der heiligen Altäre künftighin nicht mehr zu singen, sondern sich bei der Celebration der Messe nur noch mit der Recitation des Evangeliums zu befassen haben. Die übrigen liturgischen Gesänge sollen durch Subdiakonen und nöthigenfalls durch Kleriker niederen Grades vorgetragen werden.« [1]) Wenn auch diese Disciplinarverfügung in der Folgezeit ausgezeichnete Ergebnisse für die Weiterentwickelung der kirchlichen Kunst gehabt hat, so kann man sie doch schwerlich für eine Massregel zu ihren Gunsten erachten.

Dritter Einwand. Die Dokumente, auf welche Johannes Diakonus seine Behauptungen stützt, namentlich das *gregorianische Antiphonar*, stehen in keiner Weise im Einklang mit dem Kirchenkalender der Zeit des h. Gregor. Dieselben stimmen vielmehr überein mit den liturgischen Gebräuchen gegen Anfang der fränkischen Periode (750). Der Abbé Duchesne verlegt sogar die Zeit der Abfassung des von Muratori herausgegebenen gregorianischen Sakramentars noch weiter vor bis zu Papst Hadrian in die ersten Regierungsjahre Karls d. Gr. [2]) — hieraus folgt, dass man die

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1) Wir geben den Wortlaut der Verordnung im Anhang A.

2) *Origines du culte chrétien* S. 124. — Das von den Benediktinern im 3. Bande der Werke des h. Gregor herausgegebene Sacramentarium reicht nicht übers 10. Jahrh. zurück; doch sieht man an Einzelheiten (z. B. den *fünf* Advent-Sonntagen) dass die Vorlage, nach der es geschrieben ist, vor Papst Hadrian gehört. Ganz dasselbe können wir über den *Anthiphonarius gregorianus* und *Liber responsalis* sagen, die in demselben Bande stehen. Man kann darin ohne Schwierigkeit die ursprünglichen Quellen und die späteren Zusätze unterscheiden. — Auch das den Arbeiten des Amalarius zu Grunde liegende Antiphonar datierte aus der Epoche Hadrians (vgl.

Zusammenstellung des römischen Antiphonars um mehr als hundert Jahre zu früh angenommen hat; und wenn der Zusatz »gregorianisch« dabei mit irgend welchem Recht figurirt, so bezieht er sich entweder auf Gregor II., der den päpstlichen Stuhl 715—731 innehatte, oder noch wahrscheinlicher auf seinen Nachfolger Gregor III., der 741 starb.

Wir können nun einen Schritt weiter gehen und feststellen, dass die Komposition der Melodien zur Zeit dieser beiden Päpste bereits beendigt war. Eine ganz merkwürdige historische Thatsache berechtigt uns zur Aufstellung dieser Behauptung. Im 7. Jahrhundert und bis in die ersten Jahre des achten Jahrhunderts waren die Kirchen Donnerstags den Gläubigen verschlossen; ja, es war sogar ausdrücklich verboten, an diesem Tage die Messe zu celebriren, sofern nicht ein Kirchenfest auf denselben fiel. Der Grund dieses Verbots war, dass nicht nur die Anhänger des alten Kultus, sondern auch viele Christen die Gewohnheit beibehalten hatten, den dem Jupiter geheiligten Wochentag (Jovis dies, franz. Jeudi, ital. Giovedì) zu feiern. 200 Jahre nach der offiziellen Aufhebung des heidnischen Kultus und der Schliessung aller Tempel [1]) hielt sich dieser Gebrauch noch immer; er wurde feierlich verdammt durch das 589 zu Narbonne abgehaltene Konzil [2]). Im 8. Jahrhundert wurde das gegenstandslos gewordene Verbot durch Gregor II. aufgehoben, welcher die Celebration der heiligen Handlungen für die Donnerstage der Fastenzeit anordnete. Diese spezielle Thatsache ist im *Liber pontificalis* [3]) verzeichnet und wird in frappantester Weise durch die liturgischen Bücher bestätigt. So weist thatsächlich

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unsern Anhang B); es stand in bemerkenswerther Übereinstimmung mit dem oben erwähnten *Responsale gregorianum*.

1) Diese Umwandlung des Kultus fand im Jahre 391 statt. Vgl. P. Allard »*L'art païen et les empereurs chrétiens*« (Paris, Didier 1879 S. 111).

2) Kanon 15: »Ad nos pervenit quosdam de populis catholicae fidei execrabili ritu *diem quintam feriam*, qui et dicitur Jovis, *multos excolere* et operationem non facere. Quam rem pro Dei timore execrantes et blasphemantes, quicunque ab hac die, praeter festivitates in eo die venientes, ausus vel ausa fuerit vacare et operam non facere, si ingenuus est aut ingenua, de ecclesia repellendus . . .« Labbé, *SS. Concilia* (Paris 1671 Bd. 5 S. 1031).

3) »Hic quadragesimali tempore ut *quintas ferias missarum celebritas fieret* in ecclesias, quod non agebatur, instituit.« Duchesne, *Lib. Pont.* Bd. 1. S. 402 und S. 412 Anm. 19.

das sogenannte gelasianische Sakramentar — aus dem Ende des 7. Jahrhunderts [1]) — keine Messe für irgend einen Donnerstag der Fastenzeit auf, während wir deren im »gregorianischen« Sakramentar und Antiphonar für jeden Donnerstag eine antreffen. Aber es ist zu bemerken, dass die fünf Gesänge dieser Messen aus schon früher existirenden Offizien entnommen sind: ein Beweis, dass man zur Zeit Gregors II. und III. schon keine neuen Melodien mehr komponierte. Und hier bemerken wir noch weiter, dass die jüngsten Melodien der gregorianischen Sammlung ungefähr um das Jahr 700 komponiert sein müssen, da die Messen, denen für die Donnerstage der Fastenzeit die Mehrzahl der Gesänge entnommen sind (die Messen der Sonntage nach Pfingsten) im gelasianischen Sakramentar nicht stehen, also gegen Ende des 7. Jahrhunderts noch nicht existirten. Damit ist der Abschluss der Entstehungsperiode der Kirchengesänge bestimmt, und wir erkennen die Gesammtausdehnung derselben: sie umfasst beinahe 300 Jahre, von 425 bis 700.

Wenn es nun gilt, die fortschreitende Entwickelung dieser Kunst während eines so langen Zeitraumes zu verfolgen — was bisher nicht einmal versucht worden ist — so sind für dieselben die Dokumente nur spärlich und lückenhaft. Die historische Skizze, welche wir mit wenigen Federstrichen umreissen werden, ist das Ergebniss einer sehr eingehenden kritischen Analyse der gregorianischen Melodien mit Hülfe der Lichtstrahlen, welche die reiche kirchliche und die arme musikalische Litteratur dieser Jahrhunderte abgeben.

Wir theilen die ganze oben abgegrenzte Periode in zwei Epochen:

die erste — die des einfachen oder syllabischen Gesangs — umfasst die letzten Zeiten des weströmischen Kaiserthums und die ganze Dauer des gothischen Reichs;

die zweite Periode — die des verzierten Gesangs — fällt zusammen mit der Herrschaft der byzantinischen Kaiser in Rom.

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1) Duchesne, *Origines du culte chrétien.* S. 119.

III.

Während der ganzen ersten Epoche (425—552) muss der Gesang der christlichen Kirche als einer der Zweige — der jüngste — der griechisch-römischen Musik angesehen werden, die seit den Eroberungen Alexanders die Kunst des ganzen Orients geworden war, und die in den folgenden Jahrhunderten die Herrschaft Roms über das Abendland verbreitet hatte, ohne jedoch die Verschiedenheiten des nationalen Geschmacks zu verwischen. Ebenso wie die polyphone Kunst des heutigen Europa sich, ohne ihr Wesensprinzip aufzugeben, dem musikalischen Gefühl verschiedenstgearteter Nationen anpasst.

Man stellt sich gewöhnlich vor, dass die Musik des heidnischen Alterthums nach dem Siege des Christentums ziemlich schnell unterging. Das ist ein Irrthum. Im 4. Jahrh. und bis gegen Ende des 5. war die Liebhaberei für Musik noch ebenso allgemein verbreitet über die Völkerschaften des weiten römischen Reichs wie zur Zeit der Antonine. Die grosse Menge fuhr fort, sich täglich ins Theater oder ins *Odeum* zu begeben, wohin sie Aufführungen von Tragödien oder Pantomimen, Konzerte von Gesangs- oder Instrumentalvirtuosen zogen, während die Edlen und Bürger sich zu Hause an Vorträgen von Chorkompositionen ergötzten, die unter der Leitung eines *phonascus* einstudiert und aufgeführt wurden, oder sich begnügten mit der populären Kunst eines Lyraspielers, Schalmeibläsers oder einer syrischen Sängerin, die sich mit einem Saiteninstrument begleitete.[1]) In keinem wohlhabenden Hause

1) Sidonius Apollinaris rühmt in einem 454 geschriebenen Briefe den König der Westgothen Theodorich und lobt, dass er nicht Gefallen habe an der sinnlichen Musik der vornehmen Römer. »Sic tamen quod illic *nec organa hydraulica sonant, nec sub phonasco vocalium concentus meditatum acroama simul intonat.* Nullus ibi *lyristes, choraules, mesochorus, tym-*

fehlte die Pflege des Gesangs und Kitharaspiels.[1]) Nach Annahme des neuen Glaubens, der die Staatsreligion des Kaiserreichs geworden war (im 4. Jahrhundert) hatte die Masse der Bevölkerung der Städte ihre alten Lebensgewohnheiten und ihren weltlichen Culturstand beibehalten. Im socialen Leben unterschied sich in keiner Weise der christliche Laie vom Heiden, der Notable aus der Provinz vom römischen Bürger. Es bedurfte erst der definitiven Festsetzung der nordischen Barbaren in Gallien und der vorausgehenden wiederholten Plünderungszüge, um dort die Überreste römischen Lebens und römischer Sitten zu vernichten. Als Trier zum dritten Male zerstört, niedergebrannt und durch die Pest dezimiert war, sandte die Einwohnerschaft eine Deputation an den Kaiser und bat um Wiedereröffnung der Schauspiele.[2]) In Rom, wo eine eigentliche Überfluthung nicht stattfand, sondern vielmehr ein allmähliches Eindringen germanischer Elemente, hielt sich antike Sitte und Kunstübung während der ganzen Dauer der Gothenherrschaft. „*Gothorum laus est civilitas custodita*", sagt der Senator Cassiodor.[3]) Unter Theodorich (493—526) spielte man noch grosse Pantomimen mit Chören und einem stark besetzten Orchester.[4]) Wie zur Zeit Plutarchs wurden Gastmähler durch Gesänge mit Kitharabegleitung verschönt, ein Raffinement das Chlodwig, der König der Franken, sofort nach seiner Festsetzung in Gallien an seinem Hofe einführte.[5])

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panistria, psaltria canit; rege solum illis *fidibus* delinito, quibus non minus mulcet virtus animum, quam cantus auditum«. Ep. I (Ausg. Firmin-Didot S. 48).

1) Vgl. u. a. die Stelle aus Ammianus Marcellinus in meiner *Histoire et Théorie de la musique de l'antiquité* Bd. II. S. 620.

2) Salviani presbyteri Massiliensis *De gubernatione Dei* (das Werk ist zwischen 440 und 450 geschrieben) l. VI. c. 15.

3) Var. l. IX. ep. 14.

4) »Albino et Albieno patriciis, Theodoricus rex . . . Constituatur a vobis Prasini pantomimus: quatenus sumptum, quem pro spectaculo civitatis impendimus electis contulisse videamus. Hanc partem musicae disciplinae *mutam* nominare majores; scilicet quae ore clauso manibus loquitur et quibusdam gesticulationibus facit intelligi quod vix narrante lingua aut scripturae textu possit agnosci«. Var. l. 1. ep. 20. — »Pantomimo igitur, cui a multifaria imitatione nomen est, cum primum in scenam plausibus invitatus advenerit, assistunt consoni chori diversis organis eruditi.« Ib. l. IV. ep. 51.

5) Vgl. im Anhang C den Brief, in welchem Cassiodor im Namen des Gothenkönigs seinen Kollegen und Freund Boetius ersucht, den von Chlodwig gewünschten Virtuosen auszusuchen.

Als zu Ende des 4. Jahrhunderts die Mailändische Kirche und etwas später die Römische den antiphonischen Psalmengesang annahmen, haben da wohl beide auch die Melodien der Sänger von Antiochia mit herübergenommen? Die Sache ist nicht unwahrscheinlich. Gewiss ist, dass die christliche Musik ebenso wie die primitive Malerei der Katakomben, der profanen Kunst ihre Formen und Motive entnahm, allerdings unter sorgfältiger Vermeidung aller Weisen und Wendungen, welche die Erinnerung an gewisse ausschweifende Kulte oder ausdrücklich von der Kirche verbotene Schauspiele hätten wachrufen können. So wie zu Rom der Tempel „aller Götter" (das Pantheon) in die „allen Märtyrern" geheiligte Kirche umgewandelt wurde, und wie die „Mutter Gottes" an die Stelle der Magna Mater deorum (Kybele) trat, wie in Konstantinopel die heilige Sophia die Minerva ersetzte, so wurde später gar manche Melodie, welche zu Ehren des Apollon oder Jupiter erklungen war, berufen, den wahren Gott zu feiern. Der heilige Ambrosius, Prudentius, Sedulius komponierten ihre Hymnen auf die weltlichen Rhythmen des Volksliedes oder der lyrischen Poesie des Horaz. In ähnlicher Weise mussten auch die melodischen Ideen aus der zeitgenössischen Produktion geschöpft werden. Und in der That ist der Vorgang kaum anders vorstellbar, wenn man bedenkt, dass die Kompositionsweise der homophonen Musik bei allen Völkern und zu allen Zeiten ein und dieselbe natürlich sich ergebende ist. Sie besteht nämlich darin, dass man auf Grund gewisser überkommenen melodischen Typen, der sogenannten *Nomoi* (Weisen), neue Gesänge durch Erweiterung, theilweise Umgestaltung und Vermischung entwickelt.[1]) Die Motive dieser Nomoi scheinen im Alterthum gar nicht zahlreich gewesen zu sein. Die Zahl der in den Kirchengesang übergegangenen übersteigt nicht 50, und man kann mit Sicherheit aussagen, welcher Art von Musik sie entnommen sind. Ohne allen Zweifel war es nämlich die Gesangsmusik mit Kitharabegleitung, oder um sie mit dem alten technischen Ausdruck zu benennen: die *Kitharodik*. Es ist sehr bemerkenswerth, dass alle lateinischen Hymnen und neun Zehntel aller Antiphonen in den drei Haupttonarten der Kitharoden stehen: der *äolischen* oder *hypodorischen*, der dem ersten und zweiten Kirchentone entspricht; der *iastischen*, die

1) *Histoire et théorie de la musique de l'antiquité*, Bd. II S. 316.

auch die *hypophrygische* genannt wird, aus welcher der 7., 8. und 4. Kirchenton[1]) sich entwickelten, und der *dorischen*, von welcher der dritte Kirchenton stammt.[2]) Mit Ausnahme eines Bruchstücks von acht Takten gehören alle in griechischer Notierung auf uns gekommenen Überbleibsel antiker Musik gleichmässig den drei aufgeführten Tonarten an; und zwar sind diese kostbaren Fragmente — allem Anschein nach aus dem zweiten Jahrhundert herrührend — entweder Gesänge zur Kithara oder Übungen für Kithara.

Kann man sagen, dass die ersten Melodien der christlichen Kirche nur eine reine und einfache Reproduktion dieser weltlichen Melodien waren? Durchaus nicht. Zunächst müssen wir auf einen technischen Unterschied hinweisen. Niemals entbehrt im heidnischen Alterthum die Vokalmusik der Instrumentalbegleitung. Das Christenthum der ersten Jahrhunderte verwarf wie Plato in seiner Republik die Heterophonie d. h. die Harmonie im Miteinander (Mehrstimmigkeit); ja es war noch strenger und duldete im Heiligthum kein Musikinstrument. Die Orgel, die uns heute ein so durch und durch kirchliches Instru-

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1) Ich betrachte den 4. Kirchenton überall, wo ♭ vor h ausdrücklich verlangt oder doch gemeint ist, als eine Transposition des 7. in die Unterquinte mit abweichendem Schluss auf der Terz. Andererseits ist auch der sogenannte unregelmässige 8. ebenfalls ein siebenter, der zufolge ungewöhnlicher Entwickelung auf der Quinte schliesst. Ich glaube desshalb dass die Antiphonen *Veni Domine visitare nos* (im 7. Ton), *Iste puer magnus coram Domino* (im 4. Ton) und *Nos qui vivimus* (im irregulären 8.) auf ein und denselben melodischen Typus zurückzuführen sind. Hier kann ich mich darüber nicht weiter verbreiten; aber sobald ich irgend dazu Musse finde, werde ich gründlich die Frage behandeln: »Die griechisch-römischen Tonarten und Nomoi in den syllabischen Antiphonen«.

2) »Die Haupttonarten der Saiteninstrumente sind die *Doris*, *Jas* und *Aiolis*, dann kommen die *phrygische* und *lydische*.« Pollux, *Onomasticon* l. IV. c. 9. §. 65. — »Die hypodorische ist die geeignetste Tonart für die Kitharodie« [κιθαρῳδικωτάτη] Aristoteles *Problemata* XIX. 48. — Die phrygische Tonart (d′ c′ h a g f e d) ist in den einfachen Antiphonen überhaupt nicht vertreten. Ebenso steht es mit der lydischen Tonart im engeren Sinne (c′ h a g f e d c), während die beiden Abarten der lydischen Tonart (das »herabgestimmte« und »angespannte« Lydisch) hier und da vorkommen; das »herabgestimmte« Lydisch (chalara oder aneimene lydisti) oder hypolydisch plagal ist der 6. Kirchenton, in welchem kaum ein halbes Dutzend Grundmelodien stehen; das »angespannte« Lydisch (syntonolydisti, mit dem späteren Schluss auf der Tonika) ist der 5. Kirchenton, der ebenfalls in den ursprünglichen Melodien des Antiphones sehr selten vorkommt.

ment dünkt, erklang damals nur unter den Händen von Virtuosen im Conzert oder Theater. Cassiodor nennt die Stimme der Gläubigen eine „lebendige Kithara". „Was ehedem" sagt er, „durch die Instrumente gesagt wurde, wird jetzt durch vernunftbegabte Organe ausgedrückt."[1]) Und in der That, die Antiphone vor dem Psalm ist nichts anderes als das Vorspiel des Kitharoden auf die Singstimme übertragen; nach dem Psalm figuriert sie als Schlussritornell. Übrigens begnügte man sich Anfangs, die Antiphone einfach auf die Silben der hebräischen Anrufung *Halleluja* zu vokalisieren[2]): ein Gebrauch, der sich bis heute erhalten hat für die kleinen Tagzeiten des Sonntags von den Laudes bis zur None. — Allein noch viel wichtiger ist der geistige Unterschied zwischen der heidnischen und der christlichen Kunst. Man könnte die

1) Quam mirabilis ex ipsis (psalmis) profluit suavitas ad canendum! dulcisonum organum humanis vocibus aemulatur: tubarum sonitus grandiloquis clamoribus reddunt: vocalem citharam viventium chordarum permixtione componunt; et quidquid ante instrumentis musicis videbatur agi, nunc probatur per rationales substantias explicari.« *In Psalterio praefatio.*

2) Das Halleluja war ein volksthümlicher Zuruf der Christen in den ersten Jahrhunderten. Der h. Augustin vergleicht ihn mit den musikalischen Rufen der Matrosen (celeusma oder celeuma), mit welchen sie einander von weitem anhalten und Antwort gaben: »Celeusma nostrum dulce cantamus Alleluia, ut laeti et securi ingrediamur ad felicissimam patriam« (bei Gerbert *De cantu et musica sacra* Bd. 1 S. 60). Sidonius Apollonaris bringt dieselbe Ideenverbindung in einer Dichtung, die gelegentlich der Vollendung des Baues der Basilika zu Lyon durch den Bischof Patiens verfasst wurde (um 475):

»Curvorum hinc chorus helciariorum
»Responsantibus *alleluia* ripis,
»Ad Christum levat amnicum celeuma.
»Sic, sic psallite nauta vel viator:
»Namque iste est locus omnibus petendus,
»Omnes quo via duxit ad salutem.«

»Der Chor der Schiffer, auf die Ruder geneigt, sendet zu Christus seinen Seemannsgruss, dem vom Ufer (der Saône) ein Halleluja antwortet. Das sei unser Gesang zu Wasser und zu Lande! Denn hieher sollen alle eilen, wohin der Weg zum Heile führt« *Ep.* 100 (Ausg. Didot S. 153). Die Halleluja-Antiphonen gehören besonders den Offizien an, an denen von Alters her die Menge der Gläubigen Theil zu nehmen pflegte. Vgl. was Amalarius zu den Nokturnen der h. Weihnacht bemerkt (*De ord. Antiph.* c. 15, S. 1043): »Antiphonae quae celebrantur in eadem nocte circa popularem cantum, et deinceps, habent in tertio nocturno Alleluia, ut est *Ipse invocavit me* et *Laetentur coeli*, — *Notum facit Dominus* nec non et omnes antiphonae habent *Alleluia* quae canuntur in Matutinis (i. e. laudibus).«

liturgische Melodik mit der Sprache des neuen Testaments vergleichen: hier sind die Worte griechisch, die Construktion d. h. die Form der Gedanken ist semitisch; dort sind die Tonarten griechisch-römisch, aber dieselben Intervallfolgen, welche ehedem den hellenischen Geist ausdrückten, heiter, strahlend, aber ohne Innigkeit, falten sich jetzt zu den mystischen und inbrünstigen Accenten der christlichen Askese. Hören wir noch Cassiodor, diesen Römer des 6. Jahrhunderts, in welchem die antike Tradition und der neue Glaube sich in so charakteristischer Weise vereinen: „Die iastische Tonart schärft die Einsicht stumpfer Geister; sie zwingt denen, welche die Begierde irdischer Güter niederzieht, das Verlangen der himmlischen Güter auf. Die dorische Tonart weckt keuschen Sinn und Schamhaftigkeit. Die äolische beruhigt die Stürme der Seele und bringt nach dem Aufruhr einen heilsamen Schlummer."[1] Es ist hochinteressant, eine liturgische Melodie im iastischen Modus — z. B. *O Lux beata trinitas* — mit dem heidnischen Hymnus an die Nemesis[2] hinsichtlich ihrer ästhetischen Wirkung zu vergleichen. Hier und dort ist die Tonleiter dieselbe, die Melodielinien sind von gleicher Einfachheit, der Verlauf der Cantilene, die Schlussfälle weisen nur ganz leichte Abweichungen auf. Wie kommt es nur, dass der Hymnus des Mesomedes uns trocken und bizarr scheint, während wir in der christlichen Melodie etwas undefinirbar mildes und inniges empfinden, einen verwandten Klang, der uns zu Herzen geht?

Während dieser ganzen ersten Epoche war die Pflege des Kirchengesangs rein empirisch. Übrigens war es auf dem Gebiete der profanen Kunst nicht anders. Nach Schliessung der heidnischen Schulen (unter Theodosius) fielen die Theorie der Musik und die Notenschrift, da sie nirgend mehr gelehrt wurden, schnell in Vergessenheit.[3] Um das Spiel eines In-

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1) Vgl. Anhang C.

2) Vgl. Anhang D.

3) Unter Kaiser Konstantin setzt Bacchius der Ältere voraus, dass die griechische Notenschrift allen seinen Lesern bekannt ist, da er sich ihrer zur Erläuterung seiner Lehrsätze bedient. Gaudentius, der wahrscheinlich in der letzten Hälfte des 5. Jahrhunderts gelebt hat, spricht von derselben nur wie von etwas der Vergangenheit angehörigen: »Die Alten«, sagt er, »verwandten gewisse Buchstaben als Zeichen der musikalischen Töne« (bei Meibom S. 20).

struments, um Gesang oder Composition zu erlernen, war man auf das Beispiel des Lehrers, auf das eigene Ohr und die Übung angewiesen. Das genügte, um Tonartenwesen und Rhythmik kennen und handhaben zu lernen.[1]) Heute ist die Musik unendlich komplizierter; sehen wir nicht dennoch auch Personen ohne alle theoretischen Kenntnisse aus reinem Instinkt ganz korrekt rhythmisierte und harmonisierte Melodien erfinden? Zwar beschäftigten sich einige wenige Gelehrte in jenen Jahrhunderten der Unbildung mit der »Musikwissenschaft«; aber was man damals mit diesem Namen schmückte, bestand nur aus mathematischen Berechnungen der Verhältnisse der Töne und Intervalle, denen man, so gut es gehen wollte, einige meist schlecht verstandene Auszüge aus den Musikschriftstellern des Alterthums beigab: alles das ohne jede Bezugnahme auf die Praxis.[2]) Von einer der christlichen Musik eigenen Theorie und Notenschrift konnte vor der Mitte des 7. Jahrhunderts nicht die Rede sein. Cassiodor, der am Abend seines Lebens (540) in ein Kloster zurückgezogen ein Handbuch der Musiklehre für seine Mönche verfasste, erwähnt nur die fünfzehn Transpositionsskalen der jüngeren Aristoxenianer.[3]) Achtzig Jahre später begnügte sich Isidor von Sevilla, die Theorie Cassiodors abzuschreiben und zu excerpiren, und zwar mit groben Irrthümern; von einer graphischen Darstellung der Töne aber weiss er nichts, ja er leugnet ihre Möglichkeit.[4])

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1) Für diejenigen, welche an der Möglichkeit zweifeln, die zahlreichen alten Tonarten zu unterscheiden, ohne ihre Theorie erlernt zu haben, diene folgende Thatsache als Antwort. Ich kannte in meiner Jugend einen des Lesens und Schreibens unkundigen Landmann, der nicht nur in korrekter Weise alle die gebräuchlichen Tonsätze der Offizien sang, sondern der auch mit Sicherheit die (Kirchen-) Tonart jedes Gesanges bestimmte. Sobald er die ersten Noten gehört hatte, sagte er ohne Besinnen: das geht aus dem ersten, siebenten, vierten u. s. w.

2) »Citharoedus ex cithara, auloedus ex tibia ceterique suorum instrumentorum vocabulis nuncupantur. Is vero est musicus, qui ratione perpensa canendi scientiam non servitio operis sed imperio speculationis adsumpsit . . . Tria genera sunt quae circa artem musicam versantur: unum genus est quod instrumentis agitur, aliud fingit carmina, tertium quod instrumentorum opus carmenque dijudicat«. Boetius *de Musica* 1. Buch, Kap. 34.

3) *De musica* (cap. 5 des Tractats *De artibus ac disciplinis liberal. litterarum*) bei Gerbert, *Scriptores* Bd. 1 S. 15 ff.

4) »Sonus, quia sensibilis res est, praeterfluit inter praeteritum tempus, imprimiturque memoriae . . . Nisi enim ab homine memoria teneantur, soni

Selbst noch Beda Venerabilis (zu Anfang des 8. Jahrhundert) scheint noch nichts von Kirchentönen oder von einer Notenschrift in seinem angelsächsischen Kloster gehört zu haben.[1]) Doch müssen um diese Zeit beide Dinge schon seit einiger Zeit in der *Schola* zu Rom gelehrt worden sein. — Kurz — die Sänger, gleichviel ob sie die niederen Weihen hatten, oder Priester, Diakone oder auch Mönche waren, gaben den Texten der Offizien Melodien, indem sie einfach mit Hülfe des Gedächtnisses komponierten — was ist überhaupt das künstlerische Schaffen anderes als ein sich erinnern, mit dem durch die eigene Individualität bedingten Umwandlungs- und Neugestaltungsprozess? — und ihre Gesänge, einmal für den Gottesdienst angenommen, wurden durch das Gedächtniss bewahrt und durch häufiges Hören fortgepflanzt.

So bildete und häufte sich der Schatz der liturgischen Gesänge, wie der Kalender der Kirche sich allmählich mit Festen füllte. In der um 540 verfassten Ordensregel des h. Benedict, haben die Offizien für die Tagzeiten, die gewiss nur wenig von den damals in den Basiliken Roms gesungenen abwichen, bereits einen dem heutigen sehr ähnlichen Zuschnitt. Für die Laudes und Vespern, die beiden ältesten Versammlungszeiten (Synaxen) sind die wichtigsten Psalmen und Cantica die des heutigen Breviers; ebenso ist es mit den ambrosianischen Hymnen, welche zuzulassen das Römische Ritual erst mehrere Jahrhunderte später sich entschloss. Der Psalmengesang ist im allgemeinen antiphonisch, sodass zu vermuthen steht, dass die Antiphonen des Breviers der Wochentage seither zumeist unverändert geblieben sind.[2]) Wir sehen ferner, dass für grosse Kirchenfeste (Weihnachten, Epiphanias, Ostern, Himmelfahrt, Pfingsten) ja selbst schon für die Feste

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pereunt, quia *scribi non possunt.*« (*Sententiae de musica* bei Gerbert, Sriptores Bd. 1, S. 20).

1) Derjenige musikalische Traktat, welcher ihm wirklich anzugehören scheint, die *Musica theorica* (S. 344—35 des 1. Bandes der Kölner Ausgabe von 1612 [in 8 Bänden]) beschäftigt sich nur mit mathematischen Spekulationen. Das Werk des gelehrten angelsächsischen Mönchs ist der Zeit nach der letzte unter den musikalischen Traktaten, welche von der Theorie der Kirchentöne noch nichts wissen.

2) Die Officien der Laudes und Vespern nach der Benediktiner Ordensregel s. in Anhang E.

einiger Heiligen[1]) (z. B. S. Peter und Paul) bereits besondere Offizien existierten. Ohne jeden Zweifel waren auch die veränderlichen Gesangstücke der Messe ebenso seit jener Zeit vorhanden — gewiss ist das für die zwischen Epistel und Evangelium[2]) eingeschobenen — aber jedenfalls noch nicht in der musikalischen Gestalt, in welcher wir sie heute kennen; diese können sie nicht von der zweiten Hälfte des 7. Jahrhunderts erhalten haben.

Nachdem der Gesang ein integrierender Bestandtheil des Gottesdienstes geworden war, musste er eine bedeutsame Stellung in der Ausbildung der jungen Cleriker erlangen. Der künftige Diakon hatte in seinem Gedächtniss die schon recht umfängliche Sammlung der liturgischen Melodien zurechtzulegen, was ohne anhaltende Übung und zweckmässige Anleitung nicht wohl möglich war. Die *Lectoren*, Jünglinge mit heller Stimme, denen die Kirche die Recitation der Bibelworte übertrug, wurden die Zöglinge dieser ersten Seminarien, welche bei den bischöflichen Basiliken sich bildeten.[3]) Von Papst Adeodat (gest. 618) meldet uns seine Grabschrift, dass er, von früher Kindheit an (d. h. also in den ersten Zeiten der byzantinischen Herrschaft) im Alumnat der Peterskirche erzogen wurde und sich da Tag und Nacht übte im Lobgesang Christi.«[4])

Während so die Kirchenmusik ohne Unterlass an Bedeutung wuchs, erlosch die alte heidnische Kunst und starb unbemerkt ab; sie unterlag definitiv überall, wo sich die westgothischen, fränkischen und longobardischen Eroberer festsetzten. Der weltliche Gesang fiel in die Hände der Possenreisser, armer Teufel ohne Haus und Herd (»fahrende Leute«), und begann nun für mehr als fünf Jahrhunderte eine Art unterirdischer Existenz. Nach der Zerstörung oder Schliessung

1) »In sanctorum festivitatibus vel omnibus solemnitatibus, sicut diximus dominico die agendum, ita agatur; excepto quod psalmi vel antiphonae vel lectiones ad ipsum deum pertinentes dicantur«. Kap. 14.

2) Duchesne, *Orig. du culte chrétien* S. 159 ff. — Die Messe des Ostersonnabends, die man einhellig für ein Überbleibsel der allerältesten Liturgie hält, hat weder Introitus noch Offertorium, noch Kommunion, auch kein Credo und kein Agnus Dei. Der Epistel folgt kein eigentliches Gradual sondern nur ein Halleluja und ein Tractus.

3) G. B. de Rossi, »*Bollettino di archeologia cristiana*« 2. Jahrg. (1883) 4. Lief. (franz. Ausg. S. 19—20).

4) »Hic vir ab exortu Petri est nutritus ovili . . . . excubians Christi cantibus hymnisonis« *Lib. Pontif.* Bd. 1, S. 320.

der Theater blieb die Bevölkerung der Städte ohne öffentliche Vergnügungen in den öden Strassen mit ihren verfallenen Gebäuden; und bald gab es keine andere Geistesnahrung, keine andere Zerstreuung mehr als die Gesänge der Kirche. Die Herrscher der Barbaren wurden von dem Liebreiz dieser sanften Melodien bezwungen und begeisterten sich für dieselben. Gregor von Tours erzählt, dass König Gunthram als er zur Feier des Martinsfestes i. J. 585 nach Tours gekommen war und an der bischöflichen Tafel speiste, um die Mitte des Mahles darum bat, dass man das Gradual (*psalmus responsorius*) singe, das er am Abend vorher in der Messe gehört habe.[1])

Die Bedeutung des Kirchengesanges für das bürgerliche Leben dieser düstern Zeit erklärt uns die Wichtigkeit, welche die Geistlichkeit diesem Theile ihres Amtes beimass. In Gallien sehen wir den Bischof selbst als Praecentor bei hohen Festen fungieren. Praetextat von Rouen intonierte eben das Offiz der Laudes am Ostersonntag d. J. 586, als ein von Fredegundis gedungener Meuchelmörder sich auf ihn stürzte und ihn mit seinem Dolch erstach.[2]) In Rom war um dieselbe Zeit und schon noch früher — wie wir aus der Disciplinarverfügung des h. Gregor wissen — eine schöne mit Geschick behandelte Stimme das sicherste Mittel, sich den Weg zu kirchlichen Würden zu bahnen.[3]) Die Sachlage änderte sich freilich, nachdem die Päpstliche Sängerschule fest organisiert worden war. — Aber dies Ereigniss fällt in die zweite Epoche, deren geschichtlichen Inhalt wir mit wenigen Linien andeuten wollen.

1) »Interea jam medio prandii peracto jubet rex (Guntchrammus) ut diaconum nostrum, qui ante diem ad missas psalmum responsorium dixerat, canere juberem. Quo canente, jubet interim mihi ut omnes sacerdotes qui aderant, per meam commonitionem, datis ex officio suo singulis clericis, coram rege juberentur cantare. Per me enim secundum regis imperium admoniti, quisque ut potuit in regis praesentia psalmum responsorium decantavit«. Gregorii episc. Turon. *Hist. eccl. Francorum* l. VIII. cap. 3.

2) »Dum Fredegundis apud Rothomagensem urbem commoraretur, verba amaritudinis cum Praetextato pontifice habuit . . . Adveniente autem dominicae Resurrectionis die, cum sacerdos ad implenda ecclesiastica officia ad ecclesiam maturius properasset, *antiphonas juxta consuetudinem incipere per ordinem coepit;* cumque inter psallendum formulae decumberet, crudelis adfuit homicida, qui episcopum super formulam quiescentem, extracto balthei cultro, sub ascella percutit« Ib. l. VIII c. 31 (formula = Betpult).

3) Vgl. auch Duchesne, *Orig. du culte chrétien* S. 161—62.

IV.

Das Ende des Gothenreichs und der Beginn der Herrschaft der byzantinischen Kaiser (552) bezeichnen den Moment, wo zu Rom die letzten Spuren des antiken Lebens verschwinden. Der Kirche, der einzigen moralischen Macht, welche auf den Trümmern der Vergangenheit sich siegreich erhalten hat, fällt nun die Aufgabe zu, die Völker des Abendlandes einer neuen Zukunft entgegenzuführen. Diese zugleich politische, soziale und religiöse Umgestaltung vollzieht sich unter Unglück und Elend ohne Ende. Rom, bereits verarmt und entvölkert infolge langer und mörderischer Kriege, verfällt mehr und mehr vollständiger Verödung durch eine unerhörte Reihe von Landplagen: schreckliche Überschwemmungen, fortwährende Einfälle der Langobarden und schliesslich eine Pest, die in einem Zeitraum von mehr als hundert Jahren wiederholt wüthete. In dieser fürchterlichen Zeit, wo alle zerstörenden Kräfte sich zu verbünden schienen, um die armseligen Überbleibsel des grossen römischen Volkes ganz zu Boden zu drücken[1]), entfaltete sich ein neues Leben von ungewöhnlicher

1) St. Gregor d. Gr. ist der Jeremias dieser Unglückszeit; seine Schilderungen derselben (an verschiedenen Stellen in seinen Schriften) sind von schrecklicher, wahrhaft biblischer Grossartigkeit. In seinen Homilien zum Propheten Ezechiel ruft er aus: »Wohin wir sehen, nichts als Schmerz, wohin wir hören, nichts als Jammer. Die Städte sind zerstört, die Festungen geschleift, das Land ist entvölkert, und die Erde ist eine Einöde geworden. Die Äcker liegen unbebaut, kaum dass in den Städten einige Bewohner geblieben sind, und selbst diese armseligen Überreste des Menschengeschlechts erfahren täglich neue Schicksalsschläge und kommen nicht zur Ruhe. . . . Es giebt keinen Senat mehr, das Volk ist vernichtet, und das verwaiste Rom steht in Flammen (vacua ardet Roma!) . . . Von allen Seiten umstarren uns gezückte Schwerter, und überall stehen wir vor dem drohenden Tode.« Man vergleiche auch seine Beschreibung der grossen Pest und des Einsturzes der Baudenkmäler Roms zufolge der Überschwemmungen der Tiber (590) in der schönen Homilie zum Evangelium des zweiten (des heutigen ersten) Adventssonntags.

Kraft auf dem Boden der religiösen Begeisterung. Nie sah Rom so viele Kirchen erstehen wie damals. Das gesammte politische Leben konzentrierte sich in diesen geheiligten Heimstätten des Friedens. Die Zahl der kirchlichen Feste wuchs, der öffentliche Gottesdienst, voran die Messe, gestaltete sich prunkender und glänzender, und der musikalische Theil desselben wurde erweitert und bereichert. In der That weist alles darauf hin zu glauben, dass das finstere 7. Jahrhundert — das Jahrhundert Mohammeds! — den Kirchengesang zur vollen Entfaltung brachte: eine Trost spendende Stimme, die in dieser langen Nacht den Menschen die ferne Hoffnung eines neuen Morgenroths zeigte.

Als Ausdruck des christlichen Empfindens in seiner höchsten werkthätigen Begeisterung ist der Gesang der byzantinischen Zeit nicht mehr nur einfache syllabische Melodie wie in den früheren Jahrhunderten, wo Wort und Ton zusammengingen. Jetzt tritt das musikalische Element vor das Wort in die erste Reihe. Die Melodien dieser zweiten Epoche gehören dem verzierten Stil an; sie sind durchsetzt mit oft sehr ausgedehnten melismatischen Figuren, die manchmal ohne allen Text nur vokalisiert werden. In diesen klingenden Arabesken mit ihren seltsam verschlungenen Linien, erkennt man leicht den Einfluss des Orients, der in Rom unter der Herrschaft der Exarchen von Ravenna so mächtig war und der sich auf dem Gebiete der Liturgie auch durch andere charakteristische Neuerungen bemerklich macht, wie z. B. im häufigen Gebrauch der griechischen Sprache in der Kirche[1]) und der Einführung

1) Bei der Einsegnung der Konfirmanden sang man im 7. Jahrhundert das Symbolum (Credo) zuerst griechisch und dann lateinisch. Vgl. das Gelasianische Sakramentarium in Muratoris *Liturgia romana vetus* Bd. I S. 540. Beim Officium des Sonnabends vor Ostern wurde ein Theil der Lectionen und Responsorien griechisch, der andere lateinisch gesungen (*Ordo Romanus I*, bei Muratori l. c. Bd. II, S. 998). Dasselbe geschah am Vorabend des Pfingstfestes und an den Sonnabenden der Quatembertage. Das gregorianische Antiphonar und Responsale haben ausserdem den Text griechischer Antiphonen für die Prozession des 2. Februar und für die Vespern der Osterwoche. — Der Gebrauch des griechisch Singens war bereits unter Ludwig dem Heiligen in Rom wieder abgekommen: es ist das sehr wichtig für die Feststellung des Zeitpunkts der Zusammenstellung der gregorianischen Gesangbücher. Amalarius sagt bezüglich der Messe der Quatembersonnabende »Sex lectiones *ab antiquis Romanis* graece et latine legebantur, qui mos apud Constantinopolim hodieque servatur«. *De eccl. off.* lib. II. cap. 1, *de XII lectionibus* (S. 967).

von Festen, die dem römischen Ritual vordem fremd waren.[1]) Die melodischen Motive der verschiedenen Klassen verzierter Gesänge — Responsorien, Introiten, Gradualien, Hallelujah, Traktus, Offertorien und Communionen — sind zumeist dem ursprünglichen Schatze des Römischen Antiphonars entnommen; doch lässt in gewissen Gattungen von Stücken der Komponist seiner Phantasie genügend freien Lauf. Augenscheinlich haben wir im 7. Jahrhundert eine bereits vorgeschrittene Kunst vor uns, die bewusst nach Prinzipien und Regeln schafft und für jede Klasse von Kompositionen bestimmte Formen einhält.

Für eine Musik solcher Art bedurfte es aber geschickter Interpreten. Die Synodalverfügung von 595, welche den eigentlichen Gesang den Priestern und Diakonen verboten hatte, zog die Schaffung einer besonderen Korporation geistlicher Sänger nach sich, die aus Clerikern niederer Grade gebildet wurde. In diesem Sinne hat allerdings Gregor I. Anspruch auf den Namen eines Begründers der Schola cantorum, und vielleicht ist der Bericht des Johannes Diakonus in dieser Hinsicht der Wahrheit entsprechend. Im 7. Jahrhundert tritt die päpstliche Sängerschule aus dem Halbdunkel der Legende hervor und erscheint im vollen Lichte in ihrer doppelten Eigenschaft als Erziehungsanstalt und ausübende Körperschaft, mit ihrer hierarchischen Konstitution und ihrem aus erwachsenen Klerikern und für den geistlichen Stand bestimmten Knaben zusammengesetzten Personenbestande. Nirgends anders als unter den Vorstehern der Schola und unter den Priestern und syrischen Mönchen, die nach dem siegreichen Zuge der Mohamedaner (638) in Italien Zuflucht suchten, haben wir die Komponisten der Responsorien der Nachtoffizien und der besondern Gesangstücke der Messe zu suchen.

Die Päpste des 7. Jahrhunderts, die im allgemeinen sehr auf die Ausstattung und Organisation der Liturgie bedacht waren, haben gewiss alle Sorge auf Vervollständigung des

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1) Im 7. Jahrhundert wurden nämlich die vier ältesten Marienfeste von Ostrom übernommen: Mariä Reinigung (2. Febr.), welches lange seinen griechischen Namen Hypapante behielt, Mariä Verkündigung (25. März), Mariä Schlaf [Pausatio B. Mariae, jetzt Mariä Himmelfahrt] (15. Aug.) und Mariä Geburt (8. Sept.) — Aus derselben Zeit datirt auch die Herübernahme eines andern Festes aus der griechischen Kirche nach Rom, nämlich Kreuzes Erhöhung (15. Sept.). Vgl. *Lib. Pontif.* S. 29 u. 43 über das Leben Sergius' I. (Bd. 1, S. 378 u. 381).

gesanglichen Theils des Gottesdienstes und ganz besonders der Messe verwendet. Die Mehrzahl dieser Päpste kannte die Cantilena romana aus eigener Übung, und mehrfach weist ihre Grabschrift oder Biographie darauf speziell hin.[1]) Aber die hauptsächlichsten Förderer der Kirchenmusik gehören aller Wahrscheinlichkeit nach in die ziemlich lange Periode, in welcher Päpste hellenischer Abstammung auf dem Stuhle Petri sassen: es gab deren elf in der Zeit von 678 bis 752. Inmitten der geistigen Nacht, welche damals das ganze Abendland umfing, erschienen diese wissenschaftlich gebildeten, des Griechischen, Lateinischen, ja selbst der Musik kundigen Päpste den Zeitgenossen als Wunder der Gelehrsamkeit. Unter ihnen zeichnen sich besonders drei sicilianische Griechen aus, welche die Kirche unter die Heiligen versetzt hat. Papst Agathon (678—681) scheint die Texte und Melodien dessen, was man im 8. Jahrhundert das *Responsale* nannte, d. h. des heutigen Antiphonars, der vollständigen Sammlung der Offizien der Tagzeiten für das ganze Kirchenjahr, geregelt oder doch wenigstens definitiv festgestellt zu haben. Beda Venerabilis, der immer glaubwürdig ist, wo es sich um wirkliche historische Thatsachen handelt, belehrt uns, dass Agathon den Archicantor der päpstlichen Basilika nach England schickte, um dort diesen Theil des Kirchendienstes nach römischem Gebrauch zu organisieren.[2]) Leo II. (682—683) wird in der Chronik der Päpste als »tiefer Kenner in Sachen des Kirchengesangs« qualifiziert.[3]) Von Sergius I. wissen so ziemlich alle Historiker und Theoretiker des Kirchengesangs nichts, obgleich doch folgende Aufzeichnung des *Liber pontificalis*, wie mir scheint, verdient hätte, ihre Aufmerksamkeit auf sich zu ziehen: »Sergius, gebürtig aus Palermo, von einem syrischen Vater abstammend, kam nach Rom zur Zeit des Papstes Adeodat (672—676) und wurde in die Reihe der römischen Kleriker

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1) Vgl. oben (S. 29 Anm. 4.) die Stelle aus der Grabschrift des Papstes Adeodat. Honorius I. (625—638) wird bezeichnet als *divino in carmine pollens*. *Lib. Pont.* Bd. I, S. 326. Vgl. auch die Biographie Benedictus' II. (684—685) das. S. 363.

2) Vgl. Anhang F., wo wir alle Stellen der Kirchengeschichte des Beda, die sich auf die Einrichtung und Entwickelung des liturgischen Gesangs in England beziehen, zusammengestellt haben.

3) »Vir eloquentissimus . . . graeca latinaque lingua eruditus, cantilena ac psalmodia praecipuus«. *Lib. Pont.* Bd. I, S. 359.

aufgenommen; da er gebildet und in der Ausübung des Kirchengesangs geübt war, wurde er zur Verfügung des Vorstehers der Sängerschule gestellt, um an derselben Unterricht zu ertheilen«.[1]) Da er von Leo II., seinem Landsmanne, protegiert wurde, so machte er schnell die untern Grade der kirchlichen Würden durch und wurde 687 auf den päpstlichen Stuhl berufen, den er bis 701 inne hatte. Wir stehen nicht an, in diesem Papste den geistigen Urheber der letzten Arbeiten am römischen Gradual zu erkennen, welche in nichts anderem bestehen konnten als in einer Überarbeitung aller alten Gesänge des Messrituals nach einem einheitlichen melodischen Stilprinzip. Nur eine solche Massnahme kann erklären, wie es kommt, dass die Messen der ältesten Kirchenfeste (Ostern, Himmelfahrt, Pfingsten, Weihnachten, Quatember etc.) Melodien haben, welche hinsichtlich der musikalischen Faktur durchaus denen der Offizien ähnlich sind, welche zur Zeit des Papstes Sergius selbst in die Liturgie eingeführt wurden.

Wir glauben ferner, dass dieser erlauchte Papst der erste war, welcher die römischen Sänger in die Kenntniss der vier Kirchentöne mit ihren plagalen (oder der acht sogenannten gregorianischen Töne) einführte,[2]) eine Lehre die wir für syrohellenisch und von der antiken Tradition unabhängig halten. Da die Theorie der Kirchentöne von der melodischen Zerlegung des Intervalls der *Quinte* ausgeht, so ist sie im innersten Wesen verschieden von der der griechisch-römischen Modal-

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1) »Sergius, natione Syrus, Antiochiae regionis, ortus ex patre Tiberio in Panormo Siciliae, sedit ann. XIII, mens VIII, dies XXIII. Hic Romam veniens sub sanctae memoriae Adeodato pontifice, inter chorum Romanae ecclesiae connumeratus est; et quia studiosus erat et capax in officio cantilenae, priori cantorum pro doctrina est traditus«. *Lib. Pont.* Bd. I, S. 371. Unsere Uebersetzung fasst den Ausdruck *pro doctrina* in einem Sinne auf, in welchem es ein anderes sehr altes auf die *Schola cantorum* bezügliches Dokument gebraucht, nämlich einen Brief des Papstes Paul I. an Pipin den Kleinen. Wir geben denselben im Anhang G.

2) Das älteste hierauf bezügliche abendländische Dokument ist eine kurze Notiz, die Gerbert (*Script.* I. S. 26) dem Alcuin zuschreibt. Aurelianus Reomensis hat dasselbe ganz aufgenommen (S. 39—40). Die Tonart ist darin geistreicher Weise mit einem Bindemittel verglichen, durch welches alle Töne einer Melodie zusammenhängen »Octo tonos in musica consistere musicus scire debet, per quos omnis modulatio quasi quodam glutino sibi adhaerere videtur«.

skalen oder Harmonien, die auf die sieben *Oktaven*gattungen aufgebaut ist.[1]) Erst im 9. Jahrhundert, seit dem ersten Wiederaufleben der gelehrten Studien, begannen die an der Lektüre des Boetius, ihres Orakels, grossgezogenen abendländischen Musikschriftsteller die acht Kirchentöne mit den fälschlich dem Ptolemäus zugeschriebenen acht Transpositionsskalen[2]) zu identifizieren, was eine Quelle von Missverständnissen und Irrthümern wurde, die heute kaum mehr zu entwirren sind. Bis auf den heutigen Tag schrieb die allgemein angenommene Meinung dem heil. Ambrosius die erste Aufstellung der Lehre von den Kirchentonarten zu und dem heil. Gregor den endgültigen Ausbau. Es ist kaum nöthig solche Behauptungen zu widerlegen, die auf nichts begründet sind und im Gegentheil durch die ältesten bekannten Dokumente Lügen gestraft werden. Der Patriarch der mittelalterlichen Musikschriftsteller, Aurelianus Reomensis, um die Mitte des 9. Jahrhunderts spricht von den Kirchentönen wie von einer ziemlich neuen Aufstellung, die jedenfalls viel jüngeren Datums sei als die Komposition der Antiphonen der Tagzeiten.[3]) Er sagt ausdrücklich, dass sie den Griechen, d. h. den Christen des Orients zu verdanken ist, und dass diese darauf sehr stolz waren. Er belehrt uns auch des weiteren, dass Karl d. Gr., um den ihm von den abendländischen Sängern

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1) Vgl. im Anhang H die Lehre von den Kirchentönen in ihrer ursprünglichen Fassung, Text (und Übersetzung) aus der Enchiriadis Pseudo-Hucbalds.

2) Jeder, der ernstlich die griechisch-römische Musiktheorie studiert hat, weiss, dass die Lehre von den acht Tonarten (Transpositionsskalen) von Aristoxenos herrührt. Ptolemäus hat nicht nur nicht die höchste (die hypermixolydische) hinzugefügt, sondern verwirft dieselbe vielmehr ganz ausdrücklich und widmet ein ganzes Kapitel (II, 9) dem Nachweise, dass es nicht mehr als sieben Transpositionsskalen geben kann, entsprechend der Zahl der Oktavengattungen. Man ist versucht zu glauben, dass Boetius die Harmonik des Ptolemäus gar nicht selbst gekannt hat.— Nach dreihundertjährigem Verschwinden (nach Cassiodor) tauchen die Namen der antiken Tonarten bei Aurelian von Réomé wieder auf, doch ohne jede Erklärung ihrer neuen Bedeutung. Die Übertragung der Lehre des Boetius auf die Kirchentöne ist zum ersten Male formuliert in einem musikalischen Traktat Notkers (bei Gerbert, *Script.* I, S. 98) oder in einem der beiden Hucbald zugeschriebenen Traktate (das. S. 127 u. 139). Beide Dokumente scheinen in dieselbe Zeit zu gehören (Mitte des 10. Jahrhunderts).

3) »Multo ante hae (antiphonae) inventae sunt quam hi toni, et multa annorum praecessere curricula quod in gremio sanctae canuntur Ecclesiae« (bei Gerbert S. 52).

aufgewiesenen Unvollkommenheiten des Systems abzuhelfen, die acht Kirchentöne auf zwölf erweitern wollte, eine Neuerung, die sogleich von den Griechen nachgeahmt, aber nach kurzer Zeit im Morgen- wie im Abendlande wieder aufgegeben wurde.[1])

Da uns direkte Nachrichten vollständig fehlen, so weist uns alles darauf hin, die Einführung der neuen griechischen Theorie in Rom in die Zeit der griechischen Päpste zu setzen und zwar *vor dem völligen Abschluss der Sammlung der Kirchengesänge*. Denn der musikalische Bau der Responsorialgesänge verzierten Stils setzt für deren Komponisten eine objektive Kenntniss der Theorie voraus.[2]) Der Urheber der Neuerungen ergiebt sich hiernach von selbst: es ist derselbe Papst, den die römische Chronik als *studiosus et capax in officio cantilenae* bezeichnet, der Lehrer der Vorsteher der römischen *Schola*, nämlich Sergius I.

Die Länge und überaus grosse Kompliziertheit der meisten melismatischen Stücke zwingt uns auch, die Einführung eines rudimentären Tonzeichensystems, nämlich der Neumenschrift,[3])

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1) »Siquid reprehensibile hac in commentatiuncula repererit (lector), emendare festinet: sin autem displicet aut naevum erroris arbitrarit, sciat a Graecorum derivari fonte, una cum musica licentia, omnes (tonorum) varietates ibi contextas«. Das. S. 53. »Exstitere nonnulli cantores, qui quasdem esse antiphonas, quae nulli earum (i. e. varietatum) regulae possent aptari asseruerunt. Unde pius augustus avus vester Karolus, paterque totius orbis, quatuor (tonos) augere jussit . . . Et quia gloriabantur Graeci, suo ingenio octo indeptos esse tonos, maluit ille duodenarium adimplere numerum. Tunc demum Graeci, ut possent nobis esse communes, et eorum (toni) habere contubernium philosophicum Latinorum, et ne forte inferiores invenirentur gradu, itidemque quatuor ediderunt tonos . . . Qui tamen toni modernis temporibus inventi . . . semper ad priores octo eorum revertitur modulatio . . . Quamobrem non necesse est, priorum monimenta linquere patrum« etc. Das. S. 41—42. — Man sieht aus dieser Stelle, dass der heute so verschiedene Gesang der beiden Kirchen, zur Zeit Karls d. Gr. fast identisch war, was uns auch Amalarius, der sich eine Zeit lang in Konstantinopel aufhielt, bestätigt. Während aber der Gesang der Römischen Kirche heute dasselbe oder doch fast dasselbe ist, was er damals war, hat sich der Gesang der Griechischen Kirche weit von seinem alten Vorbilde entfernt.

2) Das erweist sich besonders aus der häufigen Verbindung des 3. u. 4. wie des 5. u. 6. Tones, die vom musikalischen Gesichtspunkte aus ganz verschiedene Tonarten sind, aber in der Theorie der Kirchentöne künstlich in Konnex gebracht sind.

3) Beda sagt (vergl. Anhang F.), dass der Abgesandte des Papstes Agathon, der Archicantor Johannes, nicht nur mündlich lehrte, son-

bis in die Zeit des Papstes Sergius, vielleicht sogar noch etwas weiter zurückzudatieren; dieselbe ist augenscheinlich für Gesänge mit Melismen ersonnen und für syllabisch komponierte Melodien sogar unbrauchbar. Ohne ein graphisches Mittel als Führer für das Gedächtnis scheint es kaum möglich, eine Sammlung von mehr als 1000 Gesangsstücken einzuüben und in der Erinnerung festzuhalten, *von denen die meisten nur einmal im Jahre gesungen wurden.* In der That ist das aber der einzige Nutzen, den diese Art von Notenschrift leistet: sie kann im Geiste die Erinnerung einer bekannten Melodie wachrufen, nicht aber zur Kenntnis einer neuen Melodie verhelfen.

Wir sind an der Scheide des 7. und 8. Jahrhunderts angelangt. Die liturgische Kunst ist zu normaler Grösse erwachsen. Im Laufe der folgenden Jahrhunderte und bis zum Ende des Mittelalters treibt sie zwar noch eine Menge von Nebenzweigen: in Wahrheit aber entwickelt sie sich nicht mehr weiter.

Nur eine Aufgabe blieb noch zu lösen: die Gruppierung und Zusammenstellung aller Messgesänge in einer derartigen Sammlung, wie sie Papst Agathon für die Offizien der Tagzeiten hatte ausarbeiten lassen, mit einem Worte die Redaktion des Theiles des *Liber Antiphonarius*, der unserem heutigen Graduale entspricht. Diese Aufgabe fiel, wie wir weiter oben angegeben haben, aller Wahrscheinlichkeit nach dem Syrier Gregor III. zu, dem sechsten Nachfolger von Sergius und dem vorletzten der griechischen Päpste.[1])

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dern auch die Gesänge der Horen-Offizien aufzeichnete (*etiam literis mandando*), um ihre Verbreitung unter dem angelsächsichen Mönchen und Klerikern zu erleichtern. Schrieb er nur die Texte auf oder gab er denselben auch Notenzeichen bei? Beim gegenwärtigen Stande unserer Kenntnisse scheint mir eine Beantwortung dieser Frage nicht möglich. — Jedenfalls steht fest, dass die ältesten bekannten Denkmäler der Neumenschrift nicht über das Ende des 9. Jahrhunderts zurückreichen. Die verschiedenen mit Hülfe des lateinischen Alphabetes gebildeten Notenschriftarten (deren es meines Wissens mindestens vier giebt) tauchen ebenfalls um dieselbe Zeit auf.

1) Dieser Papst entfaltete eine grosse Thätigkeit auf liturgischem Gebiet. Er richtete in mehreren Kirchen Roms neue Offizien ein und regelte deren Organisation bis ins Kleinste bezüglich des Gesanges. *Lib. Pont.* Bd. 1, S. 417 (VI), 419 (X), 421 (XVII). — Bemerken wir noch, dass wir sechs Jahre nach dem Tode Gregors III. zum ersten Male von liturgischen Sammlungen, die unseren Gradualien entsprechen, reden hören. Im Jahre 747 besassen die Kirchen Englands römische Bücher, welche die

Wie konnte aber die Erinnerung der Thatsachen, deren Wiederaufweisung wir hier versucht haben, so früh in Rom verwischt werden? — Warum liest man die Namen Agathon, Leo II., Sergius I. und Gregor III. nicht in den Annalen des katholischen Kirchengesangs?

Die Lösung dieses Problems ist wahrscheinlich in dem Religions- und Nationalitätenhass zu suchen, der zwischen Rom und Konstantinopel seit dem Schisma der Bilderstürmer (726) aufflammte, ein Hass, der noch wuchs, als die vollständige Scheidung der beiden Kirchen unvermeidlich wurde und das Papstthum das Joch der byzantinischen Despoten gegen das hochherzige Protektorat der Monarchen der karolingischen Dynastie vertauschte. Das könnte wohl die lateinischen Chronisten wie Johannes Diakonus, veranlasst haben, einen diskreten Schleier über viele Handlungen zu werfen, die von orientalischen Päpsten herrühren, und ausschliesslich die grossen Päpste italischer Abstammung ins Licht zu stellen.

Wenn es mir gestattet wäre, mein Programm in seinem ganzen Umfange zu entwickeln, so hätte ich noch weiter nachzuweisen:

Die Verbreitung des Kirchengesangs über das ganze christliche Abendland zur Zeit Pipins und Karls d. Gr., und die bemerkenswerthe Regsamkeit auf dem Gebiete der musikalischen Studien, welche deren Folge war;

das erste Erwachen musikalischer Produktivität nördlich der Alpen im Laufe des 10. Jahrhunderts unter dem befruchtenden Einflusse des römischen Antiphonars, das im Mittelalter die alleinige Quelle melodischer Anregungen war, wie die Iliade die Quelle aller Poesie im griechischen Alterthum;

die Erfindung einer vollkommenen Notenschrift im 11. Jahrhundert, ein Ereigniss, das für die europäische

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Messgesänge enthielten. Der 13. Kanon des Konzils von Cloveshou besagt: »Ut uno eodemque modo . . . in missarum celebritate, in cantilenae modo (festivitates) celebrentur *juxta exemplar videlicet quod scriptum de Romana habemus Ecclesia*«. Labbé, *SS. Concilia* Bd. VI, S. 1577.

Musik ebenso wichtig war wie für die Litteratur die Schaffung des Alphabets.

Weiter hätte ich Ihnen das Musikschaffen des Mittelalters auf einem ganz andern Gebiete zu zeigen und ihnen von einer neuen Kunst zu erzählen, welche neben der alten entstand: *dem Gesang mit mehreren gleichzeitig sich entwickelnden Melodien*, einer in ihren Anfängen barbarische und unbehülfliche Musik, die nach langem und mühseligem Wachsthum im 15. Jahrhundert unter den geschickten Händen der Meister des Kontrapunktes aus Flandern und dem Hennegau eine ganz besondere Kunst wurde, die ihren Höhepunkt im 16. Jahrhundert erreichte. Endlich, um den Schicksalen der griechisch-römischen Musik bis zum letzten Ende nachzugehen, hätte ich ihnen noch zu zeigen, wie der Gesang der römischen Kirche, nachdem er zum letzten Male seine Lebenskraft in der Zeugung des protestantischen Chorals erwiesen — das Kind seines Greisenalters — ohne Wiederkehr sich in die abendländische Polyphonie verlor, die von diesem Zeitpunkte an die *Kunst der harmonisirten Melodie* wurde, die Musik des heutigen Europa.

Aber vielleicht habe ich ihre Aufmerksamkeit schon auf eine zu harte Probe gestellt. — Ich schliesse daher mit dem Danke, dass Sie mir gestattet haben, vor ihnen die Erinnerung an diese ehrwürdigen Gesänge wachzurufen, welche mit dem ganzen Leben unserer Ahnen während einer langen Reihe von Jahrhunderten so innig verwachsen waren; diese einfachen und rührenden Weisen, in denen — über Zeitalter hinweg — die Seele des ersten Christenthums zur modernen Seele spricht und ihr die noch bebenden Laute seiner Schmerzen und und Freuden, seines glühenden Glaubens und seiner unvergänglichen Hoffnungen übermittelt.

ANHANG.

A.

Verordnung der Synode von Rom, vom 5. Juli 595.

«Regnante in perpetuum Domino nostro Jesu Christo, «temporibus piissimi ac serenissimi Domini Mauritii Tiberii et «Theodosii Augustorum, ejusdem Domini imperii Mauritii anno «tertio-decimo, indictione tertia-decima, quinto die mensis «Julii : Gregorius papa coram sanctissimo beati Petri corpore «cum episcopis omnibus ac Romanae Ecclesiae presbyteris «residens, adstantibus diaconibus, et cuncto clero dixit:

«In sancta Romana Ecclesia, cui divina dispensatio prae- «esse me voluit, dudum consuetudo est valde reprehensibilis «exorta, ut quidam ad sacri altaris ministerium cantores eli- «gantur et in diaconatus ordine constituti, modulationi vocis «inserviant, quos ad praedicationis officium eleemosynarumque «studium vacare congruebat. Unde fit plerumque, ut ad «sacrum ministerium dum blanda vox quaeritur, quaeri con- «grua vita negligatur, et cantor minister Deum moribus stimulet, «cum populum vocibus delectat. Qua in re praesenti decreto «constituo, ut in hac sede sacri altaris ministri cantare non «debeant, solumque Evangelicae lectionis officium inter missarum «solemnia exsolvant. Psalmos vero ac reliquas lectiones censeo «per subdiaconos, vel si necessitas fuerit, per minores ordines «exhiberi. Si quis autem contra hoc decretum meum venire «tentaverit, anathema sit. Et omnes responderunt: Anathema sit.»

S. Gregorii opera omnia (Ausg. der Benedictiner von Saint-Maur), Paris, Rigaud, 1705, Bd. II, S. 1288.

B.

Auszug aus der Vorrede des Buches *De Ordine Antiphonarii* von Amalarius.

«Cum longo tempore taedio affectus essem propter anti-«phonarios discordantes inter se in nostra provincia (moderni «enim alio ordine currebant quam vetusti, et quid plus reti-«nendum esset, nesciebam), placuit Ei qui omnibus tribuit «affluenter ab hoc scrupulo liberare me, inventa copia anti-«phonariorum in monasterio Corbien, id est, tria volumina de «nocturnali officio et quartum quod solummodo continebat diur-«nale, certavi a pelago curiositatis carbasa tendere ad portum «tranquillitatis. Nam quando fui missus Romam a sancto et «christianissimo imperatore Hludovico[1]) ad sanctum et reve-«rendissimum papam Gregorium,[2]) de memoratis voluminibus «retulit mihi ita idem papa : *antiphonarium non habeo quem «possim mittere filio meo domino Imperatori, quoniam hos quos «habuimus, Wala,*[3]) *quando functus est huc legatione aliqua, «abduxit eos hinc secum in Franciam.* Quae memorata volumina «contuli cum nostris antiphonariis, invenique ea discrepare a «nostris non solum in ordine, vero etiam in verbis et multi-«tudine responsoriorum et antiphonarum quas nos non can-«tamus.... Inveni in uno volumine memoratorum antiphona-«riorum, ex his quae infra continebantur, *esse illud ordinatum «prisco tempore ab Hadriano Apostolico. Cognovi nostra volu-«mina antiquiora esse aliquanto tempore volumine illo Romanae «urbis.* In quibus tamen alicubi cognovi corrigi posse nostra «ab illis, et in aliquibus nostra esse rationabilius et satius «statuta.... Arripui medium inter utraque, ut a nostris, ubi «melius erant ordinata, non discederem; et ubi poterant corrigi «a voluminibus Urbis, non negligerem, seu in ordine, seu in «verbis...

1) Ludwig der Heilige.

2) Gregor IV., Pabst von 827 bis 844.

3) Wala, berühmter Abt des Klosters Corbie, leiblicher Vetter Karls d. Gr., Rath Lothars, Königs von Italien (gest. 836).

«Notandum est volumen quod nos vocamus *Antiphonarium* «tria habere nomina apud Romanos. Quod dicimus *Gradale*, «illi vocant *Cantatorium*: [quod] adhuc juxta morem antiquum «apud illos in aliquibus ecclesiis in uno volumine continetur. «Sequentem partem dividunt in duobus nominibus : pars quae «continet responsoria vocatur *Responsoriale* et pars quae con- «tinet antiphonas vocatur *Antiphonarius.*»

Max. bibl. vet. Patrum, Bd. XIV, S. 1032.

C.

Brief (geschrieben gegen 508), in welchem Cassiodor im Namen König Theodorichs seinen Freund und Collegen Boetius beauftragt, für den Frankenkönig Chlodwig einen begabten Kitharaspieler zu suchen.

«Boetio patricio Theodoricus rex.

«Cum rex Francorum, convivii nostri fama pellectus, a «nobis citharoedum magnis precibus expetiisset, sola ratione «complendum esse promisimus, quod te eruditionis musicae «peritum esse noveramus. Adjacet enim vobis doctum eligere, «qui disciplinam ipsam in arduo collocatam potuistis attingere. «Quid enim illa praestantius, quae coeli machinam sonora «dulcedine [modulatur], et naturae convenientiam, ubique dis- «persam, virtutis suae gratia comprehendit? Quidquid enim in «conceptum alicujus modificationis existit, ab harmoniae con- «tinentia non recedit. Per hanc competenter cogitamus, pulchre «loquimur, convenienter movemur; quae quoties ad aures nostras «disciplinae suae lege pervenerit, imperat cantum, mutat ani- «mos : artifex auditus et operosa delectatio . . . . . «Incorpoream animam corporaliter mulcet, et solo auditu ad «quod vult deducit : quam tenere non praevalet verbo, tacite «manibus clamat, sine ore loquitur et per insensibilium obse- «quium praevalet sensuum exercere dominatum.

«Hoc totum inter homines *quinque tonis* agitur,[1]) qui «singuli provinciarum ubi reperti sunt nominibus vocitantur. «Miseratio quippe divina localiter sparsit gratiam, dum omnia «sua valde fecit esse laudanda. *Dorius* pudicitiae largitor et «castitatis effector est. *Phrygius* pugnas excitat et votum furoris «inflammat. *Aeolius* animi tempestates tranquillat, somnumque «jam placatis attribuit. *Iastius* intellectum obtusis acuit, et «terreno desiderio gravatis coelestium appetentiam bonorum «operator indulget. *Lydius* contra nimias curas, animaeque «taedia repertus, remissione reparat, et oblectatione corroborat. «Haec[2]) ad [saltationes] corruptibile saeculum flectens, honestum «remedium turpe fecit esse commentum.

«Hic vero numerus quinarius trina divisione consistit. «Omnis enim tonus habet summum et imum; haec autem «dicuntur ad medium.[2]) Et quoniam sine se esse non possunt, «quae alterna sibi vicissitudine referuntur, utiliter inventum «est *artificialem musicam*, id est actorum operationibus diversis «organis exquisitam, *modis quindecim* contineri.

«His rebus aliquid majus adjiciens humana solertia, terris «quamdam harmoniam doctissima inquisitione collegit, quae «*diapason* nominatur, ex omnibus scilicet congregata: ut virtutes «quas universum melos habere potuisset, haec adunatio mira- «bilis contineret.... Hinc Orpheus mutis animalibus efficaciter «imperavit.... Illo cantante, amaverunt siccas Tritones terras; «Galatea lusit in solidis; deseruerunt ursi amabiles silvas.... «Sed haec omnia humano studio per *manualem musicam* videntur «effecta.

«*Naturalis* autem *rhythmus* animatae voci cognoscitur attri- «butus, qui tunc pulchre melos custodit, si apte taceat, con- «gruenter loquatur, et per accentus viam, musicis pedibus, «composita voce gradiatur. Inventa est quoque ad permovendos «animos oratorum fortis ac suavis oratio, ut criminosis iras- «cantur judices, misereantur errantibus, et quidquid potest elo- «quens efficere, ad hujus disciplinae non est dubium pertinere

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1) *Tonus* hat hier den Sinn von Oktavengattung, Intervallordnung, ohne bestimme Tonhöhe und ist zu rechnen von einem Haupttone aus, der meist der Schlusston des Gesangs ist. *Modus*, das weiterhin vorkommt, bedeutet Tonart, Transpositionsskala.

2) *Haec* bezieht sich auf die Ausdrücke *dorius*, *phrygius*, *aeolius*, *iastius*, *lydius*. Bekanntlich bilden die fünf so benannten Transpositionsskalen das Centrum der 15 neu-aristoxenischen.

«gloriam. Poetis etiam, Terentiano testante, *duo* primum *metra* «*principalia* sunt attributa, id est *heroicum* et *iambicum* : unum «quod erigeret, alterum quod placaret.[1]) Ex quibus ad oblec- «tandum animos audientium diversa progenita sunt. Et ut «in organis toni, ita in humana voce varias animi affectiones «gravida metra pepererunt.

«Sirenas in miraculum cantasse curiosa prodit antiquitas; «et quamvis navigantes fluctus abduceret, carbasa ventus in- «flaret, eligebant, suaviter decepti, scopulos incurrere ne tantam «paterentur dulcedinem praeterire. Quibus solus Ithacus evasit, «qui nautis sollicitatorem protinus obstruxit auditum contra «noxiam dulcedinem. . . .

«Verum ut et nos talia exempla sapientis Ithaci transeamus, «loquamur de illo lapso e coelo *Psalterio*, quod vir toto orbe «cantabilis ita modulatum pro animi sospitate composuit, ut «iis hymnis et mentis vulnera sanarentur et divinitatis singu- «laris gratia conquiratur. En quod saeculum miretur et cre- «dat : pepulit Davidica lyra diabolum, sonus spiritibus imperavit; «et canente cithara ter rex in libertatem rediit, quem internus «inimicus turpiter possidebat.

«Nam licet hujus delectationis organa multa fuerint exqui- «sita, nihil tamen efficacius est inventum ad permovendos animos «quam concavae *citharae* blanda resultatio. Hinc etiam appel- «latam existimamus *chordam* quod facile corda moveat. Ubi «tanta vocum collecta est sub diversitate concordia, ut vicina «chorda pulsata alteram faciat sponte contremiscere, quam «nullum contigit attigisse. Tanta enim vis est convenientiae, «ut rem insensualem sponte se movere faciat, quia ejus sociam «constat agitatam. Hinc diversae veniunt sine lingua voces; «hinc variis sonis efficitur quidam suavissimus chorus, illa «acuta nimia tensione, ista gravis aliqua laxitate, haec media «tergo [tenore?] blandissime temperato, ut homines se ad tan- «tam perducere non praevaleant unitatem, in quantam ad «socialem convenientiam ratione carentia pervenerunt. Ibi enim «quidquid excellenter, quidquid ponderatim, quidquid rauce, «quidquid purissime, aliasque distantias sonat, quasi in unum

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1) Das aufregende (diastaltische) Ethos eignet dem *genus iambicum* (dreiteiligen Takt), das beruhigende (hesychastische) dem *genus dactylicum* (zweiteiligen Takt).

«ornatum constat esse collectum. Et ut diadema oculis varia «luce gemmarum, sic cithara diversitate soni blanditur auditui. . .

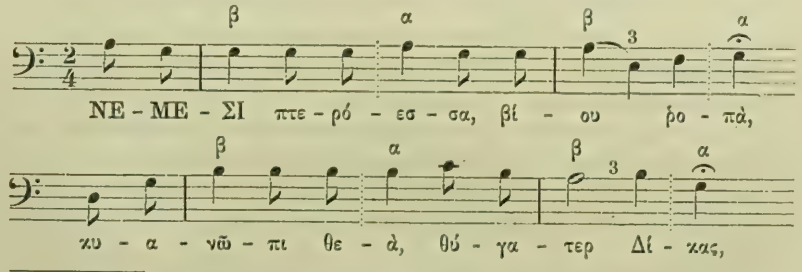
«Sed quoniam nobis facta est voluptuosa digressio (quia «semper gratum est de doctrina colloqui cum peritis) citharoe- «dum quem a nobis diximus postulatum, sapientia vestra eligat «praesenti tempore meliorem : facturus aliquid Orphei, cum «dulci sono gentilium fera corda domuerit. . . .»

Var. l. II. ep. 40 (Ausg. Garet, Bd. I. S. 35 ff.).

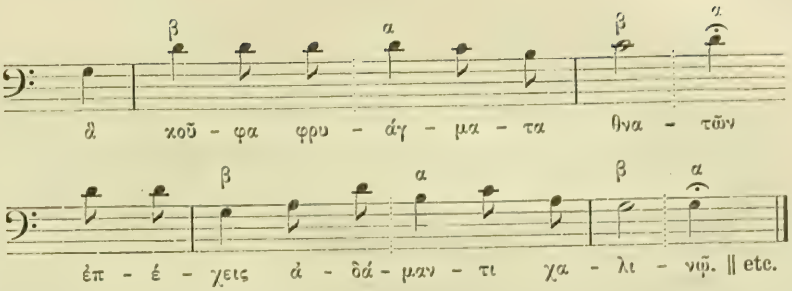
In dem hierauf folgenden Briefe (l. II, 41), der an Chlodwig selbst gerichtet ist und ihm zu einem über die Alemannen erfochtenen Siege beglückwünscht, kündigt Theodorich durch seinen Vermittler Cassiodor die demnächstige Ankunft des Virtuosen am Hofe des Frankenkönigs an: «Citharoedum etiam, «arte sua doctum, pariter destinavimus expetitum, qui ore «manibusque consona voce cantando, gloriam vestrae potestatis «oblectet. Quem ideo fore credimus gratum, quia ad vos eum «judicastis magnopere dirigendum.»

D.

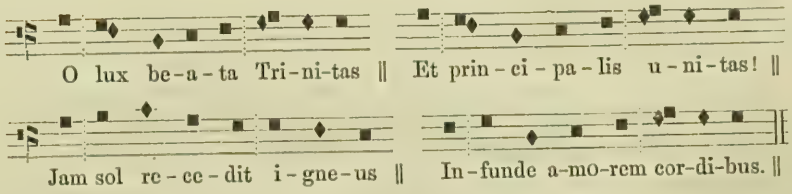
Anfang des Hymnus an *Nemesis* [1]), Gesang zur Kithara, von Mesomedes von Kreta (2. Jahrh.).



1) Nach dem Vorgange Bellermanns (*die Hymnen des Dionysius und Mesomedes*), habe ich in meiner *Histoire de la Musique de l'Antiquité*,



Melodie des Ambrosianischen Hymnus *O lux beata Trinitas* (4. Jahrh.), der Sonnabends um die Vesper gesungen wird.



diese Melodie in kyklischen (dreizeitigen) Anapästen notiert. Die Existenz eines solchen Rhythmus in den griechisch-römischen Gesängen ist heute fraglich geworden. Man muss daher auf den gewöhnlichen (zweizeitigen) Anapäst zurückkommen, der hier mit (dreizeitigen) Jamben wechselt, eine Kombination, die dem modernen Musiker keinerlei Schwierigkeiten für die Ausführung macht, sobald man nur dem Gebrauch der Alten entsprechend auf jeden Anapäst nur einen Schlag (eine Zählzeit) rechnet. Es ist das ganz und gar unser $\frac{3}{2}$ Takt, mit gelegentlicher Triolenbildung für eine der beiden Zeiten. Wir zeigen die Zeiten durch β (= basis, Niederschlag), und (α = arsis, Auftakt) an.

E.

Das Officium der Laudes *(matutinorum solemnitas)* und das der Vesper *(vespertina synaxis)* nach der Ordensregel der Benediktiner (Cap. 12, 13, 17 u. 18).

Bemerkung. Die Texte der ambrosianischen Antiphonen und Hymnen sind in dem Dokument nicht angegeben. Wir fügen dieselben als Konjektur in Klammern[1]) bei. Ein Sternchen zeigt die Stücke an, die heute bei den fraglichen Offizien nicht mehr gesungen werden.

I. Laudes matutinae in dominica.

a) Ps. 66, sine antiphona : Deus misereatur nostri.
b) *Ant.* Alleluia. Ps. 50 : Miserere mei Deus.
c) Ps. 117 : Confitemini Domino, quoniam bonus.
d) Ps. 62 : Deus, Deus meus, ad te de luce vigilo.
e) *Ant.* [Tres pueri etc.] Canticum trium puerorum.
f) *Ant.* Alleluia. Ps. 148 : Laudate Dominum de coelis; Ps. 149 : Cantate Domino; Ps. 150 : Laudate Dominum in sanctis ejus.
g) *Lectio de Apocalypsi. — h) *Responsorium (breve).
i) Hymnus ambrosianus [Aeternae lucis conditor[1])].
j) Versus. — k) *Ant.* [?] Cant. Zachariae : Benedictus Dominus Deus Israel.
l) Kyrie.

in feria secunda.

a) Ps. 66, sine antiphona : Deus misereatur nostri.
b) *Ant.* [Miserere mei etc.] Ps. 50 : Miserere mei Deus.
c) *Ant.* [Intellige clamorem meam.] Ps. 5 : Verba mea.
d) *Ant.* Ps. 35 : Dixit injustus ut delinquat.

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1) Der Gebrauch der hier angezeigten Hymnen für die Laudes und Vespern ist im 6. Jahrh. verbürgt durch die Vorschrift des Aurelian, Bischofs von Arles (gest. 555). Vgl. Daniel, *Thesaurus hymnologicus* (Halle und Leipzig, 1841—1855.), Bd. IV, S. 14.

e) *Ant.* [Conversus est furor tuus etc.] Cant. Isaiae : Confitebor tibi Domine.
f) *Ant.* [Laudate Dominum de coelis.] Pss. 148, 149, 150.
g) *Lectio Apostoli (Pauli). — h) *Responsorium (breve).
i) Hymnus ambrosianus [Splendor paternae gloriae].
j) Versus.— k) *Ant.* [Benedictus Dominus etc.] Cant. Zachariae.
l) Kyrie.

IN FERIA TERTIA.

a) Ps. 66, sine antiphona.
b) *Ant.* [Dele, Domine, iniquitatem meam.] Ps. 50.
c) *Ant.* [Salutare vultus mei etc.] Ps. 42 : Judica me Deus.
d) *Ant.* *Ps. 56 : Miserere. . . . quoniam in te.
e) *Ant.* [Cunctis diebus etc.] Cant. Ezechiae : Ego dixi.
f) *Ant.* [Omnes angeli ejus etc.] Pss. 148, 149 et 150.
Ad Bened. *Ant.* [Erexit nobis Dominus etc.].
Reliqua ut in feria II.

IN FERIA QUARTA.

a) Pss. 66, sine antiphona.
b) *Ant.* [Amplius lava me etc.] Ps. 50.
c) *Ant.* *Ps. 63 : Exaudi Deus orationem meam.
d) *Ant.* [Te decet etc.] Ps. 64 : Te decet hymnus Deus in Sion.
e) *Ant.* [Dominus judicabit etc.] Cant. Annae : Exsultavit cor meum.
f) *Ant.* [Coeli coelorum etc.] Pss. 148, 149 et 150.
Ad Bened. *Ant.* [De manu omnium etc.]

IN FERIA QUINTA.

a) Ps. 66, sine antiphona.
b) *Ant.* [Tibi soli peccavi etc.] Ps. 50.
c) *Ant.* *Ps. 87 : Domine Deus salutis meae.
d) *Ant.* [Domine, refugium etc.] Ps. 89 : Domine, refugium factus es nobis.
e) *Ant.* [Cantemus Domino gloriose.] Cant. Moysi : Cantemus.
f) *Ant.* [In sanctis ejus etc.] Pss. 148, 149 et 150.
Ad Bened. *Ant.* [In sanctitate serviamus].

IN FERIA SEXTA.

a) Ps. 66, sine antiphona.
b) *Ant.* [Spiritu principali etc.] Ps. 50.
c) *Ant.* *Ps. 75 : Notus in Judaea Deus.
d) *Ant.* [Bonum est etc.] Ps. 91 : Bonum est confiteri Domino.
e) *Ant.* [Domine audivi etc.] Cant. Habacuc : Domine audivi.
f) *Ant.* [In tympano et choro etc.] Pss. 148, 149 et 150.
Ad Bened. *Ant.* [Per viscera misericordiae etc.].

IN SABBATO.

a) Ps. 66, sine antiphona.
b) *Ant.* [Benigne fac etc.] Ps. 50.
c) *Ant.* [In veritate tua etc.] Ps. 142 : Domine exaudi orationem meam.
d) *Ant.* [Date magnitudinem etc.] Cant. Moysi (pars prima) : Audite coeli.
e) Cant. Moysi (pars altera).
f) *Ant.* [In cymbalis benesonantibus etc.] Pss. 148, 149 et 150.
Ant. ad Bened. [Illuminare Domine etc.].

II. Vesperae in Dominica

a) *Ant.* [Dixit Dominus etc.] Ps. 109 : Dixit Dominus Domino meo.
b) *Ant.* [Fidelia etc.] Pss. 110 : Confitebor tibi in toto corde meo.
c) *Ant.* [In mandata ejus etc.] Ps. 111 : Beatus vir qui timet Dominum.
d) *Ant.* [Sit nomen Domini etc.] Ps. 112 : Laudate pueri Dominum.
e) Lectio. — f) *Responsorium (breve).
g) Hymnus ambrosianus [Deus creator omnium].
h) Versus. — i) *Ant.* (?) Cant. Mariae : Magnificat.
j) Kyrie et oratio dominica.

IN FERIA SECUNDA.

a) *Ant.* [Nos qui vivimus etc.] Ps. 113 : In exitu Israel de Ægypto.

b) *Ant.* [Inclinavit Dominus etc.] Ps. 114 : Dilexi, quoniam exaudiet Dominus.
c) *Ant.* [Credidi etc.] Ps. 115 : Credidi propter quod. Ps. 116 : Laudate Dominum omnes gentes.
d) *Ant.* [Saepe expugnaverunt me etc.] Ps. 128 : Saepe expugnaverunt me.
e) Lectio. — f) *Responsorium (breve).
g) Hymnus ambrosianus [Deus qui certis legibus].
h) Versus. — i) *Ant.* [Magnificat anima mea etc.] Cant. Mariae.
j) Kyrie et oratio dominica.

IN FERIA TERTIA.

a) *Ant.* [De profundis etc.] Ps. 129 : De profundis clamavi.
b) *Ant.* [Speret Israel etc.] Ps. 130 : Domine, non est exaltatum.
c) *Ant.* [Et omnis mansuetudinis ejus.] Ps. 131 : Memento, Domine, David.
d) *Ant.* [Ecce quam bonum etc.] Ps. 131 : Ecce quam bonum et quam jucundum.
Ant. ad Magnif. [Exultavit spiritus etc.].
Reliqua ut in feria II.

IN FERIA QUARTA.

a) *Ant.* [Omnia quaecumque etc.] Ps. 134 : Laudate .... laudate servi.
b) *Ant.* [Quoniam in aeternum etc.] Ps. 135 : Confitemini Domino quoniam bonus.
c) *Ant.* [Hymnum cantate etc.] Ps. 136 : Super flumina Babylonis.
d) *Ant.* [In conspectu angelorum etc.] Ps. 137 : Confitebor.... quoniam audisti.
Ant. ad Magnif. [Respexit Dominus etc.].

IN FERIA QUINTA.

a) *Ant.* [Domine probasti me etc.] Ps. 138 (pars prima) : Domine probasti me.
b) *Ant.* Ps. 138 (pars altera).
c) *Ant.* [A viro iniquo etc.] Ps. 139 : Eripe me domine.
d) *Ant.* [Domine clamavi ad te etc.] Ps. 140 : Domine clamavi ad te.
Ant. ad Magnif. [Fac, Deus, potentiam etc.].

IN FERIA SEXTA.

a) *Ant.* [Portio mea etc.] Ps. 141 : Voce mea ad Dominum clamavi.
b) *Ant.* [Benedictus Dominus etc.] Ps. 143 (pars prima) Benedictus Dominus Deus meus.
c) *Ant.* Ps. 143 (pars altera).
d) *Ant.* [Per singulos dies etc.] Ps. 144 (pars prima) : Exaltabo te Deus.
Ant. ad Magn. [Deposuit potentes].

IN SABBATO.

a) *Ant.* Ps. 144 (pars altera).
b) *Ant.* [Laudabo Deum meum etc.] Ps. 145 : Lauda anima mea.
c) *Ant.* [Deo nostro jucunda etc.] Ps. 146 : Laudate Dominum quoniam bonus.
d) *Ant.* [Lauda Jerusalem etc.] Ps. 147 : Lauda Jerusalem Dominum.
Ant. ad Magnif. [Suscepit Deus Israel.].

Zum Kompletorium sang man wie heute die Psalmen 4, 90 und 133. Für andere Horen hat sich die Vertheilung der Psalmen sehr geändert; immerhin ist zu bemerken, dass der *alphabetische* Psalm 118 (Beati immaculati in via) wie jetzt auf die kleinen Tagzeiten vertheilt ist. Der antiphone Psalmengesang ist ausdrücklich vorgeschrieben für die Nokturnen, desgleichen für die Laudes und Vespern. Auf die kleinen Tagzeiten der Wochentage wurden die Psalmen *in directo* gesungen, wenn die Versammlung nicht zahlreich war. Das Offiz des Kompletorium ist stets Psalmodie ohne Antiphon.

An den Wochentagen sind für jede Nokturne drei Lektionen und bestimmte Responsorien vorgeschrieben; am Sonntag hat jede der drei Nokturnen vier Lektionen und vier Responsorien, und obendrein wird die letzte Nokturne mit dem Tedeum abgeschlossen.

Jede Synaxe hat einen ambrosianischen Hymnus, der an derselben Stelle eingefügt ist wie im heutigen Offizium. Das *Te decet laus*, eine Besonderheit des Benediktinerordens, ist bereits in der Regel seines Begründers erwähnt.

F.

Auszug aus Beda Venerabilis.

«Intererat huic synodo (nämlich zu York i. J. 680) .... vir venerabilis Johannes, archicantor ecclesiae sancti apostoli «Petri, et abbas monasterii beati Martini, qui nuper venerat «a Roma per jussionem papae Agathonis, duce reverentissimo «abbate Biscopo, cognomine Benedicto.... Accepit (Benedictus) «et praefatum Johannem abbatem Brittaniam perducendum, «*quatenus in monasterio suo cursum canendi annuum, sicut ad «Sanctum Petrum Romae agebatur, edoceret*; egitque abba «Johannes ut jussionem acceperat pontificis, et ordinem vide- «licet ritumque canendi ac legendi viva voce praefati monasterii «cantores edocendo, *et ea, quae totius anni circulus in celebra- «tione dierum festorum poscebat, etiam literis mandando*; quae «hactenus in eodem monasterio servata et *a multis jam sunt «circumquaque transcripta.* Non solum autem idem Johannes «ipsius monasterii fratres docebat, verum de omnibus pene «ejusdem provinciae monasteriis ad audiendum eum qui can- «tandi erant periti confluebant. Sed et ipsum per loca, in «quibus doceret, multi invitare curabant.» Ven. Bedae *Hist. eccl. gentis Anglorum*, l. IV, cap. 18 (Ausg. von Stevenson, London 1838, S. 287 ff.).

Ich ziehe hier auch die andern die Geschichte des Kirchengesangs in England betreffenden Stellen des grossen Werks des Beda aus.

I. Im Jahre 597 erlangten der Mönch Augustin und seine Gefährten, die von Gregor d. Gr. zu den Angelsachsen abgesandt waren, um sie zum Christenthum zu bekehren von Ædilbert, König von Kent, die Erlaubniss, sich in Canterbury (Doruverna) niederzulassen und dort zu predigen. «Fertur «autem quia appropinquantes civitati, more suo, cum cruce «sancta et imagine magni regis, Domini nostri Jesu Christi, hanc *laetaniam* consona voce modularentur: *Deprecamur te, «Domine, in omni misericordia tua, ut auferatur furor tuus et «ira tua a civitate ista et de domo sancta tua quoniam peccavimus. «Alleluia.*[1]» Lib. I, c. 25.

1) Diese Processions-Antiphon gehörte zum Offiz der grossen Litanei (25. April). Sie findet sich unter diesem Datum im *Antiphonarius gregorianus* der Benedictiner.

II. Paulinus, einer der Mitarbeiter Augustins, später Bischof von York, überliess sterbend (633) die Leitung seiner Kirche dem Diakonus Jacobus: «vir utique ecclesiasticus et sanctus, «qui. . . . quoniam cantandi in ecclesia erat peritissimus, recu- «perata postmodum pace in provincia et crescente numero «fidelium, etiam magister *ecclesiasticae cantionis juxta morem «Romanorum* seu Cantuariorum multis coepit exsistere.» Lib. II, c. 20.

III. Im Jahre 668, sandte Papst Vitalian als Erzbischof von Canterbury einen griechischen Mönch aus Tarsus in Cilicien, Theodorus, einen sehr gelehrten Mann und mit ihm als Coadjutor einen afrikanischen Priester Namens Hadrian. «Isque (Theodorus) primus erat in archiepiscopis cui omnis «Anglorum ecclesia manus dare consentiret. Et quia literis «sacris simul et saecularibus abundanter ambo erant instructi, «congregata discipulorum caterva, scientiae salutaris quotidie «flumina irrigandis eorum cordibus emanabant; ita ut etiam «metricae artis, astronomiae et arithmeticae ecclesiasticae dis- «ciplinam inter sacrorum apicum volumina suis auditoribus «contradarent. . . . Sed et *sonos cantandi in ecclesia*, quos eate- «nus in Cantia tantum noverant, ab hoc tempore per omnes «Anglorum ecclesias discere coeperunt; primusque, excepto «Jacobo de quo supra diximus, *cantandi magister* Nordanhym- «brorum ecclesiis Æddi cognomento Stephanus fuit,[1]) invitatus «de Cantia a reverentissimo viro Vilfrido, qui primus inter «episcopos qui de Anglorum gente essent, catholicum vivendi «morem ecclesiis Anglorum tradere didicit.» L. IV, cc. 1 und 2. «— At ipse (Vilfridus) veniens in civitate Hrofi (Rochester), «ubi defuncto Damiano episcopatus jam diu cessaverat, ordi- «navit virum. . . . . cui nomen erat Putta; maxime *modulandi «in ecclesia, more Romanorum*, quem a discipulis beati papae «Gregorii didicerat, peritum.» Ib. Der Ausdruck *discipuli beati Gregorii* kehrt oft wieder in Bedas Kirchengeschichte. Er betrifft stets die ersten zu den Angelsachsen gesandten Missionare, die sämtlich Mitglieder einer von Gregor d. Gr. vor seiner

1) Dieser Æddi, der später das vielbewegte Leben Wilfrids beschrieb, hatte nach seinem eigenen Zeugniss zum Beistande in seinen Functionen als Gesanglehrer an der Kirche von York einen anderen Sänger angelsächsischer Abkunft', Namens Æona. *Vita S. Wilfridi, episcopi Eboracensis, auctore Eddio Stephano*, c. 14 (Th. Gale, *Historiae Britannicae scriptores* XV, Oxford. Sheldon, 1691, Bd. I, S. 58).

Erhebung auf den päpstlichen Stuhl begründeten und geleiteten Klosterbrüderschaft waren. Dieselbe Bezeichnung ist auch dem heil. Augustin, dem Oberhaupte der Mission, in einem Reskript des Papstes Bonifazius IV. (608—615) von König Ædilbert beigelegt (Labbé, *SS. Concilia* Bd. V, S. 1619). Es bezieht sich daher keineswegs (wie die Benediktiner, die Herausgeber des *Antiphonarius gregorianus* zu glauben scheinen) auf eine spezielle Unterweisung im liturgischen Gesang, den diese Mönche vorgeblich von dem heiligen Papste erhalten hätten.

IV. «Cum Ædilred, rex Merciorum, adducto maligno exer-«citu, Cantiam vastaret (676) et ecclesias et monasteria. . . . . «foedaret, civitatem quoque Hrofi, in qua erat Putta episcopus, «quamvis eo tempore absens, communi clade absumsit. Quod «ille ubi comperit ecclesiam suam. . . . depopulatam, divertit «ad Sexuulfum, Merciorum antistitem, et accepta ab eo posses-«sione ecclesiae cujusdam. . . . ibidem in pace vitam finivit, «nil omnino de restaurando episcopatu suo agens; quia magis «in ecclesiasticis quam in mundanis rebus erat industrius : sed «in illa solum Ecclesia Deo serviens ubicumque rogabatur *ad «docenda ecclesiae carmina divertens,*» etc. L. IV, c. 12.

V. «Suscepit episcopatum Hagustaldensis (Hexham) eccle-«siae Acca presbyter (709). . . . «Cantatorem egregium, vocabulo «Maban, qui a successoribus discipulorum beati papae Gregorii «in Cantia fuerat cantandi sonos edoctus, ad se suosque insti-«tuendos accersiit, ac per annos duodecim tenuit; quatenus et, «quae illi non noverant, carmina ecclesiastica doceret, et ea «quae quondam cognita longo usu vel negligentia inveterare «coeperunt, hujus doctrina priscum renovarentur in statum. «Nam et ipse episcopus Acca cantator erat peritissimus.» L. V, c. 20.

Nimmt man zu diesen Notizen noch den S. 42 in der Anmerkung mitgetheilten Text, so erhält man ein ziemlich klares Bild der Hauptphasen der ersten Einrichtung des liturgischen Gesangs in England während des 7. Jahrhunderts und der ersten Hälfte des achten. Wir resümieren schnell die Daten und Fakta:

600. Augustin, Erzbischof von Canterbury führt in die Kirchen des Königreichs Kent den Kirchengesang entsprechend dem derzeitigen römischen Ritual ein, das sich allem Anschein nach nur wenig von dem unterschied, welches wir in der Benediktiner-Ordensregel beschrieben sehen.

633. Die liturgischen Melodien, bis dahin ausserhalb des Königreichs Kent unbekannt, finden Eingang in Northumberland durch die Unterweisung eines Sängers der Kirche von Canterbury, des Diakonus Jacobus. Aber die regelmässige Organisation des Gesangs der Antiphonen und Responsorien bürgert sich in den angelsächsischen Provinzen des Nordens erst ein, nachdem Wilfrid den Bischofsitz von York erlangt hat (gegen 664) und unter der Leitung von Æddi, einem andern zu Canterbury gebildeten Sänger.

680. Der Abgesandte des Papstes Agathon, Archikantor Johannes, lehrt und führt in England ein das Horasingen, wie es sich in Rom seit dem Anfang des 7. Jahrhunderts entwickelt hatte. Er redigiert auf dem Wege schriftlicher Mittheilung diesen Theil der Liturgie.

710. Der in den nördlichen Provinzen entartete Vortrag der Kirchengesänge wird durch Acca, Bischof von Hexham, unter dem Beistande Mabans, eines andern Sängers von Canterbury, wieder hergestellt.

747. Die auf der Synode von Cloveshou versammelten Bischöfe ordnen für die angelsächsischen Kirchen eine Regelung der liturgischen Gesänge an, besonders der zur Messe gehörigen, und zwar nach der offiziellen Niederschrift, die ihnen von Rom zugesandt worden ist.

Zwei Hauptpunkte sind hier festzuhalten: 1) vor 747 ist von den fünf veränderlichen Gesängen der Messe keine Rede;[1] 2) nirgend entdeckt man auch nur die leiseste Anspielung auf ein Gesangbuch, das den Namen des heil. Gregor, des grossen

---

1) Hier sind die Worte welche Æddi dem Wilfrid in den Mund legt, auf der um 700 abgehaltenen Synode von Onestrefelda (= Nesterfield?): «Nonne ego primus post obitum primorum procerum a S. Gregorio directo-«rum curavi ut... ad verum Pascha, secundum Apostolicae sedis rationem, «totam Ultra-Humbrensium gentem permutando converterem; ut juxta «ritum primitivae Ecclesiae consono vocis modulamine, binis adstantibus «choris persultare, *responsoriis, antiphonisque* reciprocis, instruerem?» *Vita S. Wilfridi,* cap. 45 (S. 75). In einem Gedicht St. Aldhelms, Bischofs von Sherborne, gest. 709 *(De basilica aedificata a Bugge, filia regis Angliae)* heisst es:

«Dulcibus *antiphonae* pulsent accentibus aures
. . . . . .
«*Hymnos* ac *psalmos* et *responsoria* festis
«Congrua promamus subter testudine templi.»

(In Mignes *Patrologia latina,* Bd. 89, S. 290).

Begründers und verehrten Begründers der englischen Kirche trüge. Die Nichtexistenz eines derartigen Dokuments ist sogar bis zur Evidenz erwiesen durch die Mission des Archikantors Johannes.

G.

Brief des Papstes Paul I. (757—767) an Pipin, König von Franken. Die durch Remedius, Bischof von Rouen, den Bruder Pipins, zum Zweck der Unterweisung im Kirchengesang nach Rom geschickten Mönche sind Simeon, dem Vorsteher (Prior) der schola cantorum, überwiesen worden. (Jaffé 2. Aufl. No. 2371).

«. . . Susceptis in praesentia Deo protectae excellentiae «vestrae syllabis, nempe relectis, protinus cuncta quae fere- «bantur in illis libenter adimplevimus. In eis siquidem com- perimus exaratum quod praesentes Deo amabilis Remedii, ger- «mani vestri, monachos Simeoni, scholae cantorum priori, con- «tradere deberemus, ad instruendum eos in psalmodiae modu- «latione, quam ab eo apprehendere, tempore quo illic in vestris «regionibus exstitit, nequiverant : pro quo valde ipsum vestrum «asseritis germanum tristem effectum, in eo quod non ejus «perfecte instruxisset monachos. Et quidem, benignissime Rex, «satisfacimus Christianitati tuae, quod nisi Georgius, qui eidem «scholae praefuit, de hac migrasset luce, nequaquam eumdem «Simeonem a vestri germani servitio abstrahere niteremur. «Sed defuncto praefato Georgio, et in ejus idem Simeon, ut- «pote sequens illius, accedens locum, ideo *pro doctrina scholae «eum ad nos accersivimus.* Nam absit a nobis ut quidpiam «quod vobis vestrisque fidelibus onerosum existit peragamus «quoquo modo. Potius autem, ut praefatum est, in vestra «charitatis dilectione firmi permanentes, libentissime, in quan- «tum virtus suppetit, voluntati vestrae obtemperandum decer- «tamus. Propter quod et praefatos vestri germani monachos

«saepedicto contradidimus Simeoni, eosque optime collocantes, «solerti industria eamdem psalmodiae modulationem instrui «praecepimus, et crebro in eadem, donec perfecte eruditi effi- «ciantur, pro amplissima vestrae excellentiae atque nobilissimi «germani vestri dilectione, ecclesiasticae doctrina cantilenae «disposuimus efficaci cura permanere,» etc.

Labbé, *SS. Concilia*, Bd. VI, S. 1686; In Mignes *Patrologia latina*, Bd. 89, S. 1187.

H.

Auszug aus der *Musica enchiriadis*, einem Traktat des 10. Jahrhunderts, der fälschlich Hucbald zugeschrieben wird.

(Cap. III). «Terminales sive «finales dicuntur [soni D E F G,] «quia in unum aliquem ex his «quatuor melos omne finiri ne- «cesse est[1]). Etenim primi toni «(i. e. *proti*) melum et subjuga- «lis sui sono archoo D regitur «et finitur. Secundus tonus «(*deuterus*) cum subjugali suo «sono E deutero regitur et «finitur. Tertius (*tritus*) ejusque «subjugalis sono trito F regi- «tur et finitur. Quartus (*tetrar- «dus*) cum suo subjugali sono «G tetrardo regitur et finitur.

«Vocatur autem *authentus* «major quilibet tonus, *plagis* «(seu plagius) minor.

«Man nennt sie [die Töne D E F G] Schlusstöne oder Finales, weil jede Melodie auf einem dieser vier endigen muss. Der Gesang im ersten Modus und seiner Nebenform (subjugalis sui) steht unter der Herrschaft des ersten Tones (archoos) D und schliesst mit ihm; der Haupt- und Schlusston des zweiten Modus und seiner Nebenform ist der zweite Ton (deuterus) E, der des dritten und seiner Nebenform ist der dritte Ton (tritus) F, der des vierten und seiner Nebenform ist der vierte Ton (tetrardus) G.

Jeder Modus heisst aber in seiner Hauptform *authentus*, in seiner Nebenform *plagis* oder *plagius*».

1) Wir fügen hier im Text an Stelle der wenig bekannten Zeichen der Dasia-Notierung Pseudo-Hucbalds die sogenannten guidonischen römischen Tonbuchstaben ein, deren erste nachgewiesene Anwendung ins 10. Jahrh. fällt in dem Odo von Clugny zugeschriebenen *Dialogus de musica* (bei Gerbert *Script.* Bd. I, S. 251 ff.).

(Cap. VIII). «Prima neumae «series ab *a* sono incipiat et «in sonum D finiat. Secunda «a ♮ sono inchoet et E sono «compleatur. Tertia a sono *c* «incipiat et in sonum F desinat. «Quarta a sono *d* ordiatur et in «sono G consistat, ita:

«Der erste Typus melodischer Folge fängt mit a an und endet mit D, der zweite beginnt mit h und läuft in E aus; der dritte hebt mit c an und hört mit F auf; der vierte nimmt seinen Ausgang von d und steht auf G still; also:»

	a		G		FGF		ED	
I.	Al	—	le	—	lu	—	ia.	
	♮		a		GaG		FE	
II.	Al	—	le	—	lu	—	ia.	
	c		♮		a♮a		GF	
III.	Al	—	le	—	lu	—	ia.	
	d		c		♮c♮		aG	
IV.	Al	—	le	—	lu	—	ia.	

«Primam dispositionem cum «cecineris, poteris dinoscere «quia vis primi soni D primi «toni virtutem creat, qui *protus* «dicitur.

«Secundam cum cecineris, «senties *tonum deuterum* a sono «E deutero gubernari.

«Tertiam assumens, videbis «similiter in sono F trito *triti* «*toni* consistere potestatem.

«Quartam cum modulatus «fueris, intelliges *toni tetrardi* «genus a sono tetrardo G pro«cedere.

«Igitur primae modulationi «quaecumque primi toni mela

«Singst du die erste Formel, so kannst du erkennen, wie die Macht des Tones D die Geltung des ersten Modus bedingt, der *Protus* genannt wird».

«Singst du die zweite, so fühlst du, wie der zweite Modus (der *Deuterus*) vom Tone E beherrscht wird».

«Nimmst du die dritte hinzu, so siehst du, wie in ähnlicher Weise auf F die Wirkung des dritten Modus (des *Tritus*) beruht».

«Hast du die vierte angestimmt, so siehst du ein, dass vom Tone G die Art des vierten Modus *(Tetrardus)* abhängt».

«Es werden daher der ersten melodischen Formel alle im

«aptari poterunt, et subjugalis «sui; sua similiter secundae, «sua similiter tertiae, sua simi- «liter quartae ad subjecta sin- «gulorum exempla.

ersten Kirchentone stehenden Melodien entsprechen, sowie die seiner(plagalen)Nebenform, und ebenso die dem zweiten, dritten und vierten Modus und ihren plagalen angehörigen Melodien der zweiten, dritten und vierten Formel».

«Modulatio ad principalem «protum et subjugalem ejus:

«Melodie im Protus authentus und seinem Plagalen:

a G $\overline{\text{FGF}}$ $\overline{\text{ED}}$
AL — LE — LU — IA.

F $\overline{\text{Ga}}$ G E F G $\overline{\text{FE}}$ D D
(Princ.) Laudate Dominum de coelis.
Fer. II ad Laudes.

F E D F E $\overline{\text{DC}}$ D $\overline{\text{EF}}$ D D
(Subj.) Coeli coelorum laudate Deum.
Fer. IV ad Laudes.

«Sequitur modulatio ad prin- «cipalem deuterum et subju- «galem ejus:

«Melodie im Deuterus und seinem Plagalen:

♮ a $\overline{\text{GaG}}$ $\overline{\text{FE}}$
AL — LE — LU — IA.

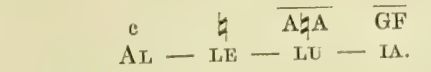
G ♮ c $\overline{\text{♮G}}$ a a G ♮ a G $\overline{\text{GF}}$ D EE[1])
(Princ.) Conſitebor Domino nimis in o — re meo.
Sabb. ad off. noct.

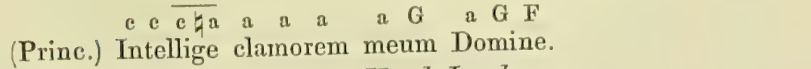
F $\overline{\text{FE}}$ D E F $\overline{\text{Ga}}$ G F G $\overline{\text{GF}}$ E E
(Subj.) Lauda-bo Deum meum in vita mea.
Sabb. ad Vesp.

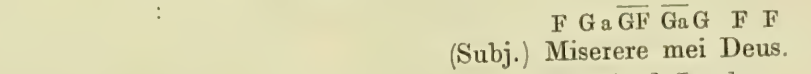
1) Diese Melodie ist seit dem 9. Jahrhundert entartet und steht heute im Tritus authentus (5. Kirchentone). Die sieben übrigen als Muster gegebenen Gesänge haben seit mehr als 1000 Jahren keine Veränderung erlitten.

«Sequitur modulatio ad principalem tritum et subjugalem «ejus:

«Melodie im Tritus und seinem Plagalen:

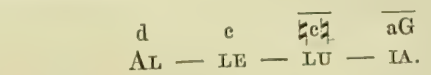


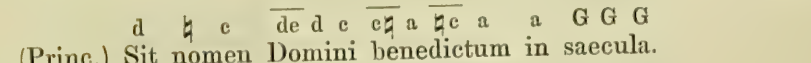


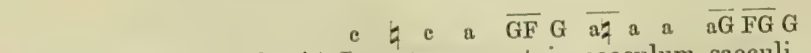


«Sequitur modulatio ad principalem tetrardum et subjugalem ejus modum:

«Melodie im Tetrardus und seinem Plagalen:







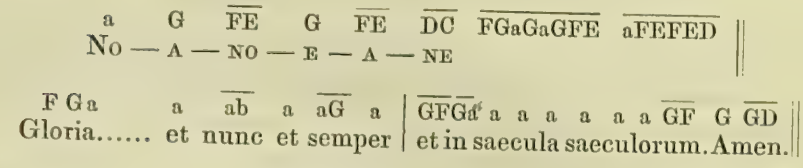
«Ad hunc modum consuetis «utuntur modulis ad investi«gandum toni cujusque vim, «eadem ratione compositis; «quorum principales quique «a suis sonis superioribus or«dientes, desinunt in finales, «minores vero in finalibus et «inchoant et consistunt, nec «superiorem attingunt locum».

«Auf diese Weise benutzt man allgemein bekannte Melodien zur Ergründung der Eigenart jedes Modus; die authentischen beginnen von ihren höheren Tönen und endigen auf dem Finaltone, die plagalen beginnen und enden mit dem Finaltone und berühren die höheren Stufen nicht».

Gerbert, *Scriptores*, Bd. I, S. 152 ff.

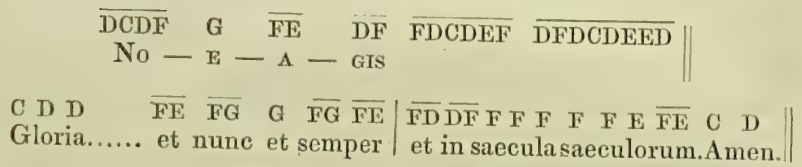
Anstatt bekannter Antiphonen bedienten sich die syro-byzantinischen und im Anschluss an sie die römischen Gesangstheoretiker zur Einprägung der charakteristischen Wendungen jedes Modus und seiner Nebenform, acht speciell für diesen Zweck auf vereinbarte Solfeggiersilben[1]) componirter Melodien. Wir geben hier diese melodischen Formeln nebst den acht im 10. Jahrhundert für das *Magnificat* und *Benedictus* gebräuchlichen Psalmen-Intonationen nach einem anderen Traktat Pseudo-Hucbalds (*Commemoratio brevis de tonis et psalmis modulandis*), in welchem sich auch die eigentümliche Notenschrift der *Enchiriadis* wiederfindet (die Dasia-Notation):

PROTUS AUTHENTUS (1. Kirchenton).



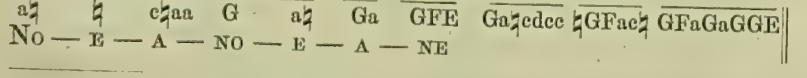
Comm. Confess. ad Bened.

PROTUS PLAGIUS (2. Kirchenton).



Oct. Nat. Dom. ad Magn.

DEUTERUS AUTHENTUS (3. Kichenton).



1) Diese sonderbaren Worte erscheinen in zahlreichen Varianten; ich gebe die Formen, die mir am häufigsten vorgekommen sind.

G a♮ ♮ d c ♮ c | G a♮ ♮ ♮ ♮ ♮ ♮ c a♮ a GE ‖
Gloria..... et nunc et semper | et in saecula saeculorum. Amen. ‖

E ED G a♮ ♮ ♮c d d♮ c d G
Qui de terra est de terra loquitur [1]....
[*Ant. Trev.*] *Oct. Nat. Dom. in I Vesp. ad Magn.*

Deuterus plagius (4. Kirchenton).

EFED Ga FG EFG FFGD CDFG FGFE ‖
No — E — A — GIS

E G a aG Ga♮ ♮ a♮ a | aG Ga a aa a aa ♮a G E ‖
Gloria..... et nunc et semper | et in saecula saeculorum. Amen.

C DE EF E E F DE D C
Omnes autem vos fratres estis....
Fer. III post Dom. II Quadr. ad Magn.

Tritus authentus (5. Kirchenton).

C♮dc a G Facdcc♮a Gac♮aGF ‖
No — E — A — NE

F a [c] c cd c ♮ c | ♮ ♮ c c c c cd c c aF ‖
Gloria..... et nunc et semper | et in saecula saeculorum. Amen.

1) Wie diese Melodien und die S. 71 mitgetheilte Antiphon *Confitebor* erweisen, hat der Deuterus authentus (3. Kirchenton), seit dem 10. Jahrhundert eine erhebliche Veränderung durchgemacht. Die Funktion der Dominante (des 2. charakterischen Tones der Tonart) ist von h auf c übergegangen. Diese Wandlung hatte sich schon zur Zeit Guidos von Arezzo vollzogen (vgl. im 11. Kap. des Micrologus die Antiphon *Tertia dies*) und ist die Folge einer früh stattgehabten verwirrenden Einwirkung des Tetrardus. Aurelianus Reomenis deutet dieselbe in einem sehr korrumpirten Satze (S. 46) an, den ich so lese: »in semet retinent quamdam connexionem authent [us] deuter [us et] tetrardus«. In seiner ursprünglichen Form steht der 3. Kirchenton in innigster Beziehung zur griechisch-römischen dorischen Tonart. Um sich dessen zu vergewissern, braucht man nur diese Kirchenmelodien mit zwei Hymnen aus dem zweiten Jahrhundert zu vergleichen, der »an die Muse« und der »an Helios«.

F a c c c c c ♮ c ♮ a c $\overline{\text{Fa}}$ $\overline{\text{cd}}$ c
Paganorum multitudo fugiens ad sepulchrum....
In festo S. Agathae ad Bened.

F G G F
Vox clamantis....
Fer. III post Dom. II Adv. ad Magn.

TRITUS PLAGIUS (6. Kirchenton).

$\overline{\text{FCF}}$ G a $\overline{\text{GF}}$ $\overline{\text{FEDC}}$ $\overline{\text{FGaGGF}}$ ‖
No — E — A — GIS [1])

F Ga a $\overline{\text{ab}}$ a $\overline{\text{aG}}$ a | G $\overline{\text{Ga}}$ a a a a a G $\overline{\text{Ga}}$ G F ‖
Gloria..... et nunc et semper | et in saecula saeculorum.Amen.

F F . . . . . .
O quam gloriosum est....
In festo Omn. SS. ad Magn.

TETRARDUS AUTHENTUS (7. Kirchenton).

d d $\overline{\text{dc}}$ $\overline{\text{cd}}$ $\overline{\text{ca}}$ $\overline{\text{Gacdc}}$ $\overline{\text{c♮aG}}$ $\overline{\text{Fac♮a♮aaG}}$ ‖
No — E — A — E — A — NE [2])

(♮) c d d $\overline{\text{df}}$ e $\overline{\text{ed}}$ e | $\overline{\text{dc}}$ $\overline{\text{cd}}$ d d d d d c d e ♮ ‖
Gloria..... et nunc et semper | et in saecula saeculorum.Amen.

G G G a c d c e d f e a d c e
Joseph fi — li David noli timere accipere....
(*Ant. Trev.*) *Fer. IV post Dom. III Adv. ad Bened.*

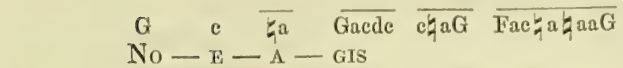
[c] ♮$\overline{\text{acaG}}$ G . .
Sub thro — no De....
In festo SS. Innoc. ad Laud.

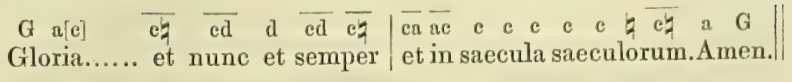
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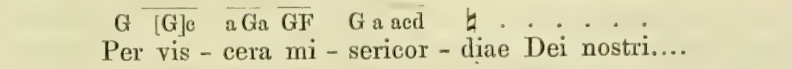
1) Ich gebe die Noten und Sylben dieser Formel wieder nach der Version von S. 229 bei Gerbert.

2) Diese Formel und die folgende sind durch Gerbert in einer confusen und ohne allen Zweifel sehr fehlerhaften Fassung gegeben. Es ist nicht wahrscheinlich, dass die Schlussneume in beiden modi dieselbe sein sollte.

Tetrardus plagius (8. Kirchenton).







Fer. VI ad Bened.

Gerbert, *Scriptores*, Bd. I, S. 214 ff.

J.

Erwiderung auf die Einwürfe der ‚*Revue Bénedictine*'.

Während der Korrektur der letzten Bögen der vorliegenden Arbeit sandte man mir eine Nummer der Zeitschrift der Ehrw. Benediktiner Patres von Maredsous (Febr. 1890) mit einer mit D. G. M., gezeichneten Besprechung meines Vortrags (der Fassung, wie ich ihn in der Akademiesitzung gelesen); der Referent bekämpft darin einige meiner Schlussfolgerungen in einer im Ganzen sehr wohlwollenden, im Einzelnen sogar für mich sehr schmeichelhaften Form, aber mit lebhafter Erregung.

Vielleicht ist es zu bedauern, dass der Verfasser der Besprechung nicht seine Worte zurückgehalten hat bis zum Erscheinen der vorliegenden auf der ersten Seite des Sitzungsberichts als nahe bevorstehend angezeigten Publikation. Andererseits giebt mir aber derselbe eine günstige Gelegenheit auf einige Punkte zurückzukommen, die ich natürlich in einer für eine grosse Zuhörerschaft berechneten und anfänglich ohne Anmerkungen und Citate gedruckten Rede nur sehr summarisch behandeln konnte. Meine Erwiderung wird, fürchte ich, nicht kurz ausfallen; aber denjenigen, welche auch nur ein wenig

mit kirchengeschichtlichen Fragen vertraut und gewohnt sind, in den unheimlichen Folianten Labbés und der Maxima bibliotheca oder auch nur in den dickleibigen Bänden von Mignes Patrologie zu blättern, wird nichts lang erscheinen.

Die ersten Einwürfe der R. B. richten sich, wie ich gewärtig sein musste, gegen meine mit einer tausendjährigen Tradition in Widerspruch tretende Behandlung der *gregorianischen Frage* (so könnte man diesen gordischen Knoten der ganzen Geschichte des Kirchengesangs nennen, insofern derselbe die Mehrzahl der fraglichen Punkte in sich schliesst).[1])

Ohne zu bestreiten, dass die Komposition des ursprünglichen Bestandes der Kirchengesänge sich bis zum Anfang des 8. Jahrhunderts habe hinziehen können, hält der Verfasser des Artikels mit glühendem Eifer die herkömmliche Meinung fest, welche *Gregor I.* die Compilation der Texte und Melodien des Antiphonars zuschreibt, und weist darauf hin, dass meine Behauptungen «die Würdigung eines Mannes in Frage stellen könnten, auf den die Kirche und der Benediktinerorden mit Recht besonders stolz sind.» — «Als Mönch und Kind der Kirche», sagt er, «halte ich es für meine Pflicht, dem grossen Papste einen der unbestreitbarsten Rechtsansprüche auf die Bewunderung und Anerkennung der Nachwelt zu wahren.» Dieser heftige Protest findet zwar seine völlige Erklärung durch die vielhundertjährige Verehrung des Benediktiner-Ordens für das Andenken des heiligen Verfassers der Dialoge, scheint mir aber doch ein wenig unzeitig angebracht. Wie, sollte das Andenken des unsterblichen Papstes durch eine einfache archäologische Streitfrage verkleinert werden können? Gregor I. hat Gott sei Dank viel wichtigere Ansprüche auf die Bewunderung und Anerkennung der Menschheit, als den, die Kirchengesänge gesammelt zu haben — Ansprüche, die über jede Anfechtung erhaben sind. Obgleich ich nur ein simpler Laie bin, verehre ich ihn doch als einen der grössten Päpste (wenn nicht als den grössten), als eine der im idealsten Sinne sympathischen Persönlichkeiten der Geschichte, und wahrlich diese Empfindung ist in

1) Durch die *R. B.* werde ich belehrt, dass die von mir aufgestellte Ansicht bereits von einem kirchlichen Shriftsteller, Eckart, verfochten worden ist (ich bekenne in aller Bescheidenheit, dass dieser Name zum ersten Male mein Ohr trifft). Das wundert mich gar nicht. Ich bin im Gegentheil überrascht, dass die schwache Begründung der gregorianischen Tradition nicht schon längst und von vielen aufgezeigt worden ist.

mir nicht abgeschwächt worden, seit ich dahin gekommen bin, die Wahrheit der Erzählung von seiner persönlichen Betheiligung an der Einrichtung des Kirchengesangs anzuzweifeln.[1]) Darf ich es sagen? die Erzählung des Johannes Diakonus, die uns eine Art Schulmeister vorführt mit einer Ruthe, die die widerspenstigen Knaben in Respekt erhalten soll, benimmt in meinen Augen der majestätischen Gestalt des Nachkommen der erlauchten Familie der Anicius etwas von ihrer Grösse.

Ich werde daher mit völliger Seelenruhe die Frage noch einmal prüfen und die von der *R. B.* angezogenen Texte und Beweismittel abwägen, um zu sehen, ob sie der Art sind, dass sie meine Ansicht ins Wanken bringen können.

Zuvörderst aber muss ich ein Missverständniss beseitigen. Ich lese in der *R. B.* diesen Satz: «Herr Gevaert stellt mit Recht die verschiedenen gregorianischen Gesangbücher bezüglich ihrer Ächtheit in eine Linie». . . Vergebens suche ich nach, wo und wann ich eine derartige Erklärung könnte abgegeben haben, die meinen Ansichten so schnurstracks zuwiderläuft. Dass man *seit dem 9. Jahrhundert* dem gregorianischen Sakramentar und dem gregorianischen Antiphonar einen gemeinsamen Ursprung zuschrieb, dass dieselben «unter gleicher Etikette» auf uns gekommen sind, das sind keine Thatsachen, die eine Umwandlung meiner Überzeugung entscheiden könnten. Ebensogut wie seine Vorgänger, die Bearbeiter des leonischen und gelasianischen Sakramentars, konnte sehr wohl auch der heil. Gregor Orationen und Benediktionsformeln zusammenstellen oder an diesem oder jenem Theile der Messe eine Änderung treffen (in der That führt der *Liber pontificalis* einen Satz an, den er in den Kanon eingeschoben hat), ohne sich darum auch nur im mindesten mit der Sammlung der heiligen Messgesänge beschäftigt zu haben. Allein die Aufhellung des ersten Theils dieser Frage ist nicht meine Sache. Das Sacramentarium ist ein durchaus kirchliches Buch, und ich als «Weltkind» erlaube mir über dessen Ursprung keinerlei eigene Meinung. In dieser Hinsicht beziehe ich mich auf die Autorität eines gelehrten Strenggläubigen, des Abbé Duchesne; und wo ich des Sakramentars bedarf, um Licht in irgend einen

1) Die *R. B.* steift sich sehr darauf, Gregor nicht für den *Urheber*, sondern nur für den *Sammler* der Melodien auszugeben. Meines Wissens hat man das Verhältniss nie anders aufgefasst.

Punkt meiner Spezial-Untersuchungen zu bringen, beschränke ich mich darauf, die sicheren Ergebnisse der neuesten liturgischen Forschungen zu verwerthen.

Mit dem Antiphonar steht es anders. Dasselbe gehört nicht nur der katholischen Liturgie sondern der Musikgeschichte an und gehört darum ins Bereich der Musikforschung, geradeso wie die kirchlichen Bauten ins Gebiet der Architektur gehören. Die homophone Melodik der römischen Kirche kennzeichnet die erste Periode abendländischer Kunst, wie die nächstfolgenden Epochen durch den Discantus, den kontrapunktischen Vocalsatz, den dramatischen Stil und die Instrumentalmusik repräsentiert werden.

Von diesem Gesichtspunkte aus habe ich — wie das der Nebentitel meiner Arbeit («musikgeschichtliche Studie») ausweist — versucht, nach bestem Wollen und Können den Ursprung des Kirchengesangs aufzudecken, indem ich mich aller mir zugänglichen Mittel der Forschung bediente; dabei liess ich besonders das beweiskräftigste von allem nicht aus dem Auge: die vergleichende Analyse der Denkmäler dieser uralten Kunst, der Melodien selbst.

Indem ich mich so auf ein wohlbegrenztes Arbeitsfeld stellte, hatte ich mich in keiner Weise wegen eines möglichen Konflikts meiner Ideen mit gewissen allgemein bei der Geistlichkeit angenommenen Traditionen zu beunruhigen, *die doch nicht im mindesten von der Kirche als Glaubensartikel vorgeschrieben sind.* Was darüber auch die *R. B.* sagen mag, die Kirche ist bei dieser Streitfrage nicht im mindesten interessiert. Für sie macht es, denke ich, wenig Unterschied, ob der Sammler des Antiphonars Gregor I. oder Gregor III. gewesen ist, welcher letztere ebenfalls ein grosser Papst und ein Heiliger war, während es für die musikalische Alterthumsforschung von grösstem Interesse ist, zu wissen, ob die reich verzierten Melodien, welche beim Gottesdienst Aufnahme fanden, schon gegen 600 existierten, oder ob sie erst später ihre definitive Gestaltung angenommen haben. Denn im ersteren Falle könnte z. B. von byzantinischen Einflüssen keine Rede sein, da solche zur Zeit des heil. Gregor in der Liturgie noch wenig bemerklich sind.[1])

Demgemäss habe ich es hier nur mit dem Antiphonar

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1) Vgl. dessen weiterhin mitgetheilten Brief an den Bischof von Syrakus.

zu thun und will es nur mit diesem zu thun haben. So höre man nun, nachdem das konstatiert ist, in chronologischer Folge alle zur Stützung der überkommenen Tradition angezogenen Zeugnisse, die älteren Datums sind als Johannes Diaconus.

I. **St. Aldhelm,** zwischen 680 und 709, *De laudibus virginitatis*, Cap. 42 (in Mignes *Patrologia latina*, Bd. 89, S. 142):

«Mihi quoque operae pretium videtur, ut S. Agathae rumores, castissimae virginis Luciae praeconia subsequantur, quos praeceptor et paedagogus noster Gregorius in canone quotidiano, quando missarum solemnia celebrantur, pariter copulasse cognoscitur.»

Nach der *R. B.* weist diese Stelle deutlich auf das gregorianische Messritual (Sacramentarium) hin. Ich widerspreche dem ganz und gar nicht. Auf alle Fälle hat das aber keinen Bezug auf unsern Gegenstand.

II. **St. Egbert,** Bischof von York von 732—766 (ich übernehme die Daten der *R. B.*), *De institutione catholica Dialogus*, Interrogatio XVI, *de jejunio quatuor temporum* (in Mignes Patrologia latina Bd. 89 S. 440—442):

A. «De primo mense Dominus ait ad Moysen etc... Quod jejunium sancti Patres in prima hebdomada mensis primi statuerunt, quarta et sexta feria et sabbato... *Nos autem in Ecclesia Anglorum idem primi mensis jejunium (ut noster didascalus beatus Gregorius in suo antiphonario et missali libro per paedagogum nostrum beatum Augustinum transmisit ordinatum et rescriptum) indifferentur de prima hebdomada quadragesimae servamus.*»

B. «Secundum jejunium quarti mensis a veteri lege exortum est... Quod juxta congruentiam temporum post ascensionem Domini ad coelos... tunc indictum est jejunium quarti mensis, secundo sabbato. *Hoc autem jejunium idem beatus Gregorius per praefatum legatum, in antiphonario suo et missali, in plena hebdomada post Pentecostem Anglorum Ecclesiae celebrandum destinavit. Quod non solum nostra testantur antiphonaria, sed et ipsa quae cum missalibus conspeximus ad apostolorum Petri et Pauli limina.*»

C. Tertium jejunium septimi mensis in Ecclesia celebratur secundum antiquam consuetudinem, vel quia decrescunt dies et nox augetur.... *Hoc Anglorum Ecclesia in plena hebdomada ante aequinoctium .... solet celebrare.*»

D. Quartum jejunium mense Novembrio a veteribus cole-

batur juxta praeceptum Domini ad Jeremiam. . . Hac ergo auctoritate Ecclesia catholica morem obtinet, et jejunium mense celebrat decimo, sabbato quarto... *Quod et Anglorum (Ecclesia) semper in plena hebdomada ante Natale Domini consuevit (celebrare)... Nam haec a temporibus Vitaliani et Theodori Dorovernensis archiespiscopi inolevit in Ecclesia Anglorum consuetudo.*»

Wären die hier durch die Schrift ausgezeichneten Sätze wirklich vor Karl d. Gr. geschrieben, so wären sie, wie ich zugeben muss, für meine Thesen sehr unbequem. Aber es ist nicht schwer zu beweisen, dass sie nicht aus dieser Zeit herrühren. In erster Linie ist kein stichhaltiger Grund vorhanden, den *Dialogus* dem Bischof Egbert zuzuschreiben.[1]) Schon im vorigen Jahrhundert hat der berühmte Kirchenschriftsteller Mansi zwischen dem *Dialogus* und dem *Poenitentialis* (einem Werke Egberts, dessen Authentizität unbestritten ist) schwerwiegende Discordanzen bezüglich einer dogmatischen Frage aufgewiesen.[2]) Weiter enthüllen sich die fraglichen Sätze selbst durch ihre Abfassung und den Mangel an Zusammenhang mit dem übrigen Texte als dem ursprünglichen Schriftwerke fremde Bestandtheile. Ich kann in ihnen nichts anderes sehen als Randbemerkungen irgend eines englischen Mönchs oder Klerikers im 9. oder 10. Jahrhundert, die später dem Texte des Dialogus eingefügt worden sind; und vollends die Erwähnung eines für authentisch angesehenen und *ad limina Apostolorum* deponierten gregorianischen Antiphonars versetzt uns ganz und gar in die Zeit des Johannes Diakonus.

Ein vereinzeltes aus mehr als einem Grunde zweifelhaftes Dokument kann nicht schwerer wiegen als der Gesamtbestand unanfechtbarer Texte gleicher Nationalität und bestimmten Datums, wie ich sie weiter oben zusammengestellt habe (S. 55—59). Ich bin daher berechtigt, dies Zeugniss abzulehnen, so lange man mir nicht klar nachweist, dass wir darin wirklich die Worte Egberts von York oder eines andern Schriftstellers des 8. Jahrhunderts vor uns haben.

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1) Das geschah zuerst 1644, wo die Schrift zum ersten Male zu Dublin durch den irischen Archäologen James Ware herausgegeben wurde.

2) Bei Migne, *Patr. lat.* Bd. 89, S. 380. Der *Poenitentialis* erklärt eine durch einen unwürdigen Priester vollzogene Taufhandlung für ungültig: »Si vir a presbytero adultero baptizatus sit, statim rebaptizetur«, während der *Dialogus* die gegentheilige Auffassung vertritt, die *seit der Zeit Karls d. Gr.* die allein orthodoxe wurde.

III. **Papst Hadrian I.** (772—795). «Die Briefe, mit welchen derselbe 794 an Karl d. Gr. liturgische Bücher (das *Sacramentar* und *Antiphonar*) übersendet, bezeugen dieselben unbestreitbar als Gregor d. Gr. zu verdankende Sammlungen.» Diese Versicherung der *R. B.* scheint mir keineswegs von einwandfreier Richtigkeit zu sein. Ich habe in Jaffés *Regesta* die gesammte Korrespondenz Hadrians mit Karl d. Gr. durchgesehen und finde darin nur einen einzigen Brief, der sich auf eine Sendung liturgischer Bücher bezieht. Derselbe ist wiedergegeben als zwischen 784 und 792 geschrieben, und der Papst spricht darin *einzig und allein vom Sacramentarium*, das «von seinem heiligen Vorgänger Gregor geordnet sei.»

«De sacramentario vero a sancto disposito praedecessore nostro deifluo Gregorio papa: immixtum vobis emitteremus. Jam pridem Paulus grammaticus a nobis eum pro vobis petente, secundum sanctae nostrae Ecclesiae traditionem per Johannem monachum atque abbatem civitatis Ravennantium vestrae regali emisimus excellentiae».[1]) Jaffé, 2473 (1900); Cod. Car. S. 274.

Von einem Antiphonar oder irgend einem andern Gesangbuch nicht die geringste Erwähnung.

IV. **Amalarius** (815—835). Mit lebhaftestem Staunen las ich folgende Worte: „Alle Schriften des Amalarius protestieren ohne Unterlass gegen jeden, der zu Anfang des 9. Jahrhunderts dem heil. Gregor die Ehre der Sammlung des Schatzes der römischen Kirchengesänge hätte streitig machen wollen". Falls nicht mein ehrw. Gegner andere Schriften des Diakonus von Metz zur Verfügung hat als die *De ecclesiasticis officiis* und *De ordine antiphonarii*, so weiss ich wirklich nicht, auf welche Texte er seine Aufstellung stützen will. Ich wage sogar, die diametral entgegengesetzte Behauptung aufrecht zu erhalten, dass *Amalarius niemals den heil. Gregor für den Ordner des Antiphonars gehalten hat.* Und

1) Man könnte vielleicht diesen Text noch nachträglich besprechen und sich fragen, ob Hadrian wirklich Gregor I. und nicht etwa Gregor III. meinte. Die Bezeichung »mein Vorgänger« nimmt sich immerhin seltsam aus in Bezug auf einen vor fast 200 Jahren gestorbenen Mann, zumal zwei Päpste gleichen Namens nur 30—50 Jahre vorher das Kirchenregiment geführt hatten. Jedenfalls sind die Epitheta *sanctus* und *deifluus* in der Frage nicht ausschlaggebend. Nannte nicht Paul I. seinen eigenen Bruder Stephan II. »sanctissimus Stephanus papa«? (Migne, Bd. 89, S. 1141) Aber ich will darauf nicht bestehen. *Ne sutor ultra crepidam.*

ich beweise dieselbe durch die oben (S. 44—45) theilweise wiedergegebene Vorrede, wo der alte Liturgist Rechenschaft ablegt über die Methode, die er bei der Zusammenstellung eines Antiphonars für den Gebrauch seiner Kirche und der Kirche des ganzen fränkischen Reichs befolgte. Eine einfache Analyse seines Berichtes genügt, um uns darüber ins Reine zu bringen.

Von Ludwig dem Frommen mit der erwähnten Arbeit betraut und verwirrt durch die erheblichen Abweichungen der Gesangbücher unter einander, begab er sich auf Geheiss seines Souveräns nach Rom (augenscheinlich gegen 830), um vom Papste Gregor IV. ein Exemplar zu erbitten, das ihm als Muster dienen könnte. Der heilige Vater antwortete auf diese Bitte: «Ich habe kein Antiphonar, das ich meinem Sohne und Herrn dem Kaiser senden könnte. Die, welche wir besassen, sind durch Wala, Abt von Corbie, als er in besonderem Auftrage hierher kam[1]), nach Frankreich mitgenommen worden.» Nach Frankreich zurückgekehrt, begab sich Amalarius nach Corbie und fand dort die vier von Wala mitgenommenen Bände, die eine vollständige Sammlung sämtlicher liturgischen Gesänge bildeten. Er entdeckte in einem dieser Bände, dass diese Sammlung zuerst durch *Papst Hadrian* geordnet worden war. Andererseits besass die Kirche zu Metz Gesangbücher, die *etwas älter* (antiquiora aliquo tempore) waren als die neuerdings aus Rom gebrachten. An manchen Stellen fand Amalarius die Fassung der römischen Bücher besser, an anderen erschien ihm die Lesart der Metzer vorzuziehen. «Ich wählte einen Mittelweg,» sagt der gute Diakonus, «indem ich mich an unsere eigenen Bücher hielt überall wo mir ihre Lesart besser zusagte, und sie nach den römischen Exemplaren korrigierte, wo dafür ein Grund vorlag.»

Ist es hiernach nicht klar wie der Tag, dass man weder das Antiphonar von Corbie noch das von Metz für das Werk des heil. Gregor hielt? Und wo bleibt da die Behauptung, der *R. B.*, dass die seit dem Ende des 8. Jahrhunderts von Rom nach Gallien gekommenen Antiphonarien den Namen

1) Man könnte auch mit Recht fragen, was denn aus dem berühmten Antiphonar St. Gregors geworden sei, das der Sänger Petrus, der Reisegenosse des Romanus dreissig oder vierzig Jahre vorher nach Metz gebracht haben musste, wenn man der Chronik von St. Gallen glaubt. Man müsste sagen, dass Amalarius davon nie hatte reden hören.

Gregor d. Gr. trugen? Wenn es zu dieser Zeit in Italien oder in Frankreich ein Gesangbuch gegeben hätte, das diesen ehrwürdigen Namen trug, [1]) hätte dann wohl Amalarius sich vermessen, selbst eine ähnliche Sammlung zusammenzustellen mit der Ungeniertheit, die wir gesehen haben, und hätte dann überhaupt die ihm von Ludwig dem Frommen anvertraute Mission irgendwelchen Sinn gehabt?

Allerdings scheint an einer Stelle des Traktats *De ecclesiasticis officiis* der Zusatz «gregorianisch» sich wenigstens indirekt auf ein Gesangbuch zu beziehen, aber aus der Art seiner Anwendung im Satze geht hervor, dass der Verfasser nicht im geringsten an den heil. Gregor d. Gr. gedacht hat: «*Auctor missalis qui vocatur gregorialis et antiphonarii nos tangit ut recolamus Nativitatem Domini*» etc. . . . d. h. der Verfasser des *sogenannten gregorianischen* Missale und des Antiphonars [1]) . . . das wäre doch eine ziemlich merkwürdige Ausdrucksweise von einem meiner Hypothese gegensätzlichen Standpunkte aus.

Das genügt denke ich zum Beweise, wie schlecht berathen die Traditionalisten sind, wenn sie sich auf die Autorität des Amalarius berufen.

V. **Walafrid Strabo,** Abt von Reichenau 841-848. Indem ich in der gekürzten Fassung meines Vortrags diesen Namen beiseite liess, lud ich in den Augen der *R. B.* den Schein auf mich, dass ich Johannes Diaconus allein die ganze Erfindung dessen aufbürdete, was man, der Kürze wegen, mir erlauben mag die «musikalische Legende vom heil. Gregor» zu nennen. Die vorliegende Gestaltung meiner Arbeit in extenso drückt aber unzweideutig genug aus, wie ich in dieser Hinsicht denke. Gewiss, es steht fest, dass noch vor der Mitte des 9. Jahrhunderts, höchstens 10 oder 15 Jahre nach den von Amalarius berichteten Thatsachen, Gregor d. Gr. von den Mönchen von Reichenau, St. Gallen und andern Klöstern dieser Gegenden, nicht nur als Verfasser des nach ihm benannten Sacramentariums sondern auch als Organisator des Kirchengesangs angeführt wird: sein Name erscheint in dieser Zeit auf dem Titelblatt verschiedener Antiphonarien. Zwei Stellen eines Traktats des Walafrid *De exordiis et incrementis rerum ecclesiasticarum* beglaubigen das. Die eine ist bereits oben mitgetheilt (S. 15, Anm. 2); hier ist die andere:

1) Vgl. oben S. 15 Anm. 1.

«Traditur Beatum Gregorium, sicut ordinationem missarum et consecrationum, ita etiam cantilenae disciplinam, maxima ex parte in eam, quae hactenus quasi decentissima observatur, dispositionem perduxisse, sicut et in capite Antiphonarii commemoratur.» *Max. bibl. vet. Patrum*, Bd. XV, S. 192).

Aber wie ich schon bemerkte (S. 15, Anm. 2), die Sache ist mit einigem Vorbehalt erzählt, wie eine gewöhnliche umlaufende Tradition («creditur», «fertur») und ohne jedwedes historische Detail. Der gelehrte Abt, der die kirchliche Litteratur gründlich kannte und gern aus dem *Liber pontificalis* schöpfte, wusste sehr wohl, dass das eine Meinung jungen Datums war, die man mit Vorsicht aufzunehmen hatte.

So sagen denn von fünf Zeugen, die berufen sind, das Alter der auf die musikalische Rolle Gregor I. bezüglichen Tradition zu konstatieren, zwei nichts aus, was auf die Sache selbst Bezug hätte; der dritte ist zurückzuweisen, weil er seine Identität nicht nachweisen kann; der vierte sagt öffentlich zu Gunsten der Gegenpartei aus. Nur der letzte, der wegen seines geringen Alters nicht schwer ins Gewicht fällt, bezeugt die Existenz der Tradition um 840, d. h. mehr als 230 Jahre nach dem Tode des berühmten Papstes.

Vierzig Jahre später stehen wir zum ersten Male einer bestimmten Behauptung, einer umständlichen Erzählung gegenüber. Unter der Feder des Johannes Diaconus ist die unbestimmte Tradition zur Geschichte geworden: der heil. Gregor stellt das Antiphonar zusammen, gründet die Schola und unterrichtet selbst die Gesangsschüler. Noch mehr: im Jahr 880 zeigt man die — recht sonderbaren — Reliquien, welche die Thätigkeit des heiligen Papstes als musikalischer Pädagoge bezeugen: eine *Ruthe* und ein *Ruhepolster*. Endlich hat man auch ein überaus kostbares Monument entdeckt (von dessen Existenz 50 Jahre vorher Gregor IV. und Amalarius keine Ahnung hatten): das authentische (!) Antiphonar Gregors I. Das alles ist ganz gewiss sehr merkwürdig. Ausgenommen die erste Thatsache, die Walafrid als Gerücht wiedererzählt, ist keiner der Umstände dieser historischen Mittheilung je von einem früheren Schriftsteller verzeichnet worden. Man kann deshalb Johannes Diaconus als verantwortlichen Redakteur, wenn nicht gar als Urheber der gregorianischen Legende bezeichnen.

Aber — sagen die Parteigänger der Tradition — der

Historiograph des Papstes Johannes VIII. konnte aus den geheimen Archiven der päpstlichen Kammer schöpfen und «durch schriftliche Aufzeichnung die in der Korporation der Sänger fortlebende Erinnerung der Organisationsarbeit festlegen.» Ein solches Argument könnte einiges Gewicht haben, wenn wir es mit einem gewissenhaften und ehrlichen Schriftsteller wie Beda zu thun hätten, verliert dagegen allen Werth, wenn es sich um einen notorisch unzuverlässigen[1]) — um nicht mehr zu sagen — Autor handelt.

Wünscht man ein Pröbchen der Manier, wie Johannes Diaconus seine Dokumente benutzte? Um es zu finden, brauche ich meinen Gegenstand nicht zu verlassen.

Nachdem er sich breit über die Ungeschicklichkeit der fränkischen und deutschen Sänger und ihre Unfähigkeit, die feinen Gesangsmanieren der Römer nachzumachen, ausgelassen, fährt unser Historiker folgendermassen fort:

»Hinc est quod hujus Gregorii tempore, cum Augustino tunc Britannias adeunte, per occidentem quoque Romanae institutionis cantores dispersi, barbaros insigniter docuerunt. Quibus defunctis occidentales Ecclesiae ita susceptum modulationis organum vitiarunt, ut Johannes quidam Romanus cantor cum Theodoro aeque cive Romano sed Eburaci episcopo per Gallias in Britannias a Vitelliano sit praesule destinatus; qui circumquaque positarum Ecclesiarum filios ad

»Daher unterwiesen seit der Zeit des h. Gregor, während Augustinus sich nach England wandte, Sänger der römischen Schule verstreut über die Länder des Occidents, in bewundernswürdiger Weise die Barbaren des Nordens. Allein nach ihrem Tode gerieth bei der abendländischen Kirche diese von Rom empfangene Gesangsmethode derart in Verfall, dass ein gewisser Johannes, ein römischer Sänger begleitet von Theodorus, der gleichfalls römischer Bürger, aber Bischof

1) Bereits im 16. Jahrhundert wies der berühmte Kardinal Baronius Irrthümer bei Johannes Diaconus nach. Übrigens gesteht dieser selbst in seiner Vorrede unumwunden ein, wie wenig Sorgfalt er auf chronologische Genauigkeit verwandt habe, die doch die conditio sine qua non aller Geschichtsschreibung ist: »re vera non tantum *quando* fecisset sed *quantum* fecisset sollicitus deflorare curavi«. Man kann sagen, dass er nie beabsichtigt hat, eine wirkliche Geschichte zu schreiben sondern vielmehr einen Panegyricus, der einem Papste gefallen könnte, welcher eine enthusiastische Verehrung für den h. Gregor I. an den Tag legte.

pristinam cantilenae dulcedinem revocans, tam per se, quam per suos discipulos multis annis Romanae doctrinae regulam conservavit«. (Lib. II, cap. 8).

von York war, durch Papst Vitalian nach Gallien und von da nach England geschickt wurde, und nach Wiederherstellung des ursprünglichen Wohllautes der Melodien in den Kirchen dieses Landes durch seine und seiner Schüler eifrige Thätigkeit die Principien der römischen Lehre durch eine lange Reihe von Jahren aufrecht erhielt«.

Es ist unmöglich, mehr Missgriffe und Irrthümer anzuhäufen, als man in diesem kurzen Paragraphen beieinander findet, dessen sachlicher Inhalt offenbar der Kirchengeschichte Bedas entnommen ist: 1) die als Johannes quidam bezeichnete Persönlichkeit (die kein geringerer als der Archikantor der Peterskirche und Abt von St. Martin war) wurde nicht unter Papst Vitalian (657—672) sondern unter Agathon (678—681) nach England geschickt. 2) Sein Begleiter war der Abt von Wearmouth, Benedictus Biscop und nicht Theodorus; letzterer reiste vielmehr zur Zeit Vitalians ab aber mit einem Abt Namens Hadrian. 3) Theodor war niemals Bischof von York, wohl aber Erzbischof von Canterbury: er ist in den Annalen der Kirche berühmt unter dem Namen Theodorus Cantuariensis. 4) Er war nicht römischer Bürger, sondern Grieche; er stammte aus Tarsus in Cilicien.

Dies Beispiel genügt wohl, denke ich, vollständig, uns einen Massstab für die Glaubwürdigkeit zu geben, die dem Biographen Gregors I. beizumessen ist. Übrigens scheinen seine Erzählungen bei den Zeitgenossen nicht eben viel Anklang gefunden zu haben; Regino von Prüm, Hucbald, Remi von Auxerre gedenken ihrer niemals. Später werden sie, erweitert und con amore aufgeputzt durch die Chronisten der Klöster, zur Quelle anmuthiger Legenden wie der von den Sängern Petrus und Romanus (zwei augenscheinlich symbolische Namen) die im 11. Jahrhundert der Annalist von St. Gallen [1]) erzählt.

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1) Ekkehardi IV., *Casus S. Galli*, bei Pertz, *Monumenta Germaniae historica*. Bd. II, S. 102. Die Erzählung gipfelt in der bekannten Anekdote,

Um nun mit der gregorianischen Frage zu Ende zu kommen, muss ich noch folgende Entgegnung widerlegen, welche meinem zweiten Einwand (S. 16) gegenübergestellt worden ist:

«Die Korrespondenz Gregors enthält einen Brief, der *für sich allein* genügt, zu zeigen, dass der grosse Papst sich für liturgische *und musikalische* Fragen doch etwas mehr zu interessiren wusste als man darzustellen beliebt.» Zum Beweis, wie wenig ich die in den letzten Worten enthaltene Anklage verdient habe, lege ich dem Leser, in einer französischen Übersetzung, welche die *R. B.* nicht zurückweisen wird — nämlich der des Don Guéranger [1]) — das vollständige Dokument vor, nämlich einen Brief an Johannes, Bischof von Syrakus, vom Monat Oktober 598 [2]), und begnüge mich, den lateinischen Text nur da in Klammern beizufügen, wo er mir nicht streng genug eingehalten zu sein scheint.

»Un homme venant de Sicile m'a dit que quelques-uns de ses amis, grecs ou latins, sous prétexte de zèle envers l'Eglise romaine murmuraient contre mes réglements, disant: *Comment prétend-il abaisser l'Église de Constantinople, lui qui en suit les coutumes en toutes choses?* Comme je lui disais: Quelles coutumes suivons-nous? il m'a répondu: *Vous avez fait dire Alleluia aux Messes hors du temps pascal; vous faites marcher les sous-diacres sans tuniques; vous faites dire Kyrie eleison; vous avez ordonné de dire l'Oraison dominicale aussitôt après le Canon.* A cela j'ai repondu que dans aucune de ces choses nous n'avons suivi

»Ein Mann aus Sizilien kam zu mir und sagte, dass einige seiner Freunde, Griechen oder Lateiner, unter dem Vorwande des Eifers gegen die römische Kirche gegen meine Anordnungen murrten und sagten: »Wie kann er beanspruchen, die Kirche von Konstantinopel zu beherrschen, da er in allem ihre Gewohnheiten befolgt?« Als ich ihm sagte »Welche Gewohnheiten befolgen wir?« antwortete er mir »Ihr lasst in den Messen ausserhalb der Osterzeit das Hallelujah singen; ihr lasst die Subdiakonen ohne Tunika gehen; ihr lasst das Kyrie eleison singen; ihr habt angeordnet, dass das Gebet des Herrn (Vater unser)

wo man Kaiser Karl d. Gr. als Schiedsrichter in einem Kreise römischer und fränkischer Sänger sieht, deren letzteren er befiehlt, an die Quellen zurückzugehen. »Revertimini vos ad fontem Sancti Gregorii«.

1) *Institutions liturgiques* (Le Mans und Paris, 1840) Bd. I, S. 167—169.

2) Jaffé, Po. 1550). *S. Gregorii opera* Bd. II, S. 939.

les usages d'une autre Eglise. Car pour ce qui est de l'Alleluia, la tradition nous apprend qu'il a été introduit ici par le bienheureux Jérôme au temps du pape Damase de sainte mémoire, à l'imitation de l'Eglise de Jérusalem, et encore faut-il remarquer que dans ce Siège, nous avons retranché plutôt quelque chose à ce que l'on avait ainsi reçu des Grecs. Si je fais marcher les sous-diacres sans tuniques, c'est l'ancienne contume de l'Eglise; seulement dans la suite du temps, il avait plu à quelqu'un de nos pontifes, je ne sais lequel, de les revêtir ainsi. Mais vos propres églises (de Sicile) ont-elles donc reçu la tradition des Grecs? Aujourd'hui encore, chez vous, d'où vient que les sous-diacres paraissent couverts d'une simple tunique de lin, si ce n'est parce qu'ils ont reçu cet usage de l'Eglise de Rome, leur mère?

D'ailleurs nous ne disons pas *(neque diximus neque dicimus) Kyrie eleison* à la manière des Grecs. Chez eux tous le disent ensemble; chez nous il n'y a que les clercs, et le peuple répond; et de plus nous disons autant de fois *Christe eleison*, que les Grecs ne disent jamais. Dans les messes quotidiennes, nous passons sous silence certaines choses que l'on a coutume de dire aux

gleich nach dem Kanon folgt.« Darauf antwortete ich ihm, dass wir in nichts von alledem dem Gebrauch einer anderen Kirche folgten. Denn, was das Hallelujah anlangt, so lehrt uns die Tradition, dass dasselbe hier durch den heiligen Hieronymus zur Zeit des Papstes Damasus heiligen Andenkens eingeführt worden ist, und zwar im Anschluss an die Kirche von Jerusalem, auch ist zu bemerken, dass dasselbe im Bereich unserer Herrschaft eher etwas eingeschränkt worden ist gegen den von den Griechen übernommenen Gebrauch. Wenn ich die Subdiakonen ohne Tunika gehen lasse, so ist das alter Brauch der Kirche; nur hatte es im Lauf der Zeiten einem von uns Päpsten gefallen, sie damit zu bekleiden. Aber haben denn eure (sizilianischen) Kirchen die Tradition der Griechen? Wie kommt es, dass bei Euch noch heute die Subdiakonen nur mit einer einfachen Leinentunika bekleidet erscheinen, wenn nicht, weil ihr diesen Gebrauch von eurer römischen Mutterkirche erhalten habt?

Uebrigens sagen wir weder noch sagten wir das *Kyrie eleison* auf die Art der Griechen. Bei ihnen sagen es alle zusammen, bei uns nur die Kleriker, und das Volk antwortet, auch sagen wir eben so oft

autres jours, et nous disons seulement *Kyrie eleison* et *Christe eleison*, en les chantant avec un peu plus de lenteur *(ut in his deprecationibus vocibus paulo diutius occupemur)*. Nous disons l'oraison dominicale aussitôt après le Canon, parce que telle a été la coutume des Apôtres, qui, en consacrant l'hostie de l'oblation, se contentaient de cette prière. Il nous eût paru inconvenant de réciter sur l'oblation une prière redigée par un savant *(quam scholasticus composuerat)* et d'omettre de réciter sur le corps et le sang du Redempteur celle qu'il a lui-même composée. De plus l'oraison dominicale chez les Grecs est dite par tout le peuple, tandis que chez nous c'est le prêtre seul qui la récite.

En quoi avons nous donc suivi les coutumes des Grecs, nous qui n'avons fait que rétablir nos anciens usages ou en introduire d'utiles, quand bien même on prouverait qu'en cela nous avons imité les autres? Quand donc Votre Charité aura occasion d'aller à Catane ou à Syracuse, qu'elle ait soin d'instruire sur ces différents points tous ceux

Christe eleison, wie die Griechen nie gesagt haben. In den Alltags-Messen gehen wir mit Stillschweigen über einiges hinweg, das man an anderen Tagen zu recitiren pflegt, und wir sagen nur einmal Kyrie eleison und Christe eleison mit etwas langsamerem Vortrag. Das Gebet des Herrn sagen wir sogleich nach dem Kanon, weil es so bei den Aposteln gebräuchlich war, welche bei der Weihung der Opfer-Hostie sich mit diesem Gebet begnügten. Es hätte uns unpassend erschienen, auf die Consecration der Hostie ein von einem Kirchengelehrten verfasstes Gebet zu sprechen und auf Fleisch und Blut des Erlösers das Gebet nicht zu sprechen, das er selbst verfasst hat. Übrigens wird bei den Griechen das Gebet des Herrn vom ganzen Volke gesprochen, während es bei uns nur der celebrirende Priester recitiert.

Worin sind wir denn also dem Gebrauche der Griechen gefolgt, wir, die nur die alten Gebräuche wiederherstellten und nützliche neue einführten? Und wenn man uns selbst nachweisen könnte, dass wir dabei andere nachgeahmt hätten? Wenn daher Ew. Liebden Gelegenheit haben nach Catania oder Syrakus zu gehen, so tragen Sie doch Sorge, alle die,

qu'elle sait avoir murmuré à ce sujet; quelle s'y prenne à propos pour leur faire entendre ces raisons. Quant à ce qu'ils disent de l'Eglise de Constantinople, qui doute qu'elle ne soit sujette au Siège Apostolique, ainsi que le très pieux Empereur et notre frère, l'évêque de cette ville le professent assidûment? Néanmoins si cette Eglise, ou toute autre, a quelque chose de bon, de même que je réprime mes inférieurs, lorsqu'ils font des choses illicites, de même je suis prêt à les imiter dans ce qu'ils ont de bon. Ce serait folie de mettre la primauté à dédaigner d'apprendre ce qui est le meilleur«.

welche darüber gemurrt haben, über diese Punkte aufzuklären, und seien Sie bedacht, ihnen diese Gründe mitzutheilen. Und was sie über die Kirche von Konstantinopel sagen — wer zweifelt denn daran, dass dieselbe diesem apostolischen Stuhle untersteht, wie es der fromme Kaiser und unser Bruder der Bischof dieser Stadt beständig anerkennen? Dennoch, sollte diese Kirche oder irgend eine andere etwas Gutes besitzen — so wie ich meine Untergebenen tadle, wenn sie etwas unerlaubtes thun, ebenso bin ich bereit, ihnen nachzuthun, wenn sie etwas gutes haben. Es wäre Narrheit, den Vorrang darin zu suchen, dass man es unter seiner Würde hält, das bessere zu lernen«.

Nun frage ich jeden Menschen, der nicht voreingenommen ist: kann man aus diesen Zeilen die geringste Spur von Interesse für den musikalischen Theil des Gottesdienstes herauslesen? Der Papst zeigt darin nur ein Bestreben: sich gegen den Vorwurf der Inkonsequenz zu vertheidigen, der ihm von den Parteigängern des Bischofs von Konstantinopel gemacht ist. Wenn er auf die Ausführung des Kyrie und Pater noster zu sprechen kommt, so geschieht das ersichtlich, weil er sich verpflichtet glaubt, Punkt für Punkt die Argumente seiner Widersacher zu entkräften.

Das ist alles, was die Traditionalisten zur Stützung ihrer Meinung in einem so ausgedehnten und so vollständigen Schatze von Briefen haben entdecken können, in welchem sich Gregor I. von allen Seiten zeigt: als Pontifex, Bischof, Stadtoberhaupt, Verwaltungsbeamter, Staatsmann und Privatmann! Ist es menschenmöglich, dass er während 13 Jahren nicht ein einziges Mal Veranlassung gefunden hätte, sich mit irgend jemand

über das Thema zu unterhalten, das ihm vorgeblich so am Herzen lag, über einen Theil des Gottesdienstes, den er doch so naturgemäss der ganzen Sorgfalt der Bischöfe und Priester, seiner täglichen Korrespondenten, hätte empfehlen müssen? Ist dies absolute Schweigen nicht erdrückend für meine Gegner und wahrhaft entscheidend? Damit erscheint mir die «gregorianische Frage» zur Genüge geklärt. Kompetente Männer haben jetzt die Prozess-Akten vor Augen; die welche in sich die erforderliche Unparteilichkeit fühlen, können nun mit Sachkenntnis ihr Urtheil abgeben.

Bezüglich der übrigen Partien meiner Arbeit, werde ich versuchen, den Ausstellungen und etwas übereilten Behauptungen der *R. B.* kürzer zu erwidern. Hier ist zunächst das Urtheil, das man über meine Unterscheidung der zwei Stil-Perioden des liturgischen Gesangs fällt. «Diese Annahme einer so scharf abgegrenzten Posteriorität der melismatischen Gesänge ist nicht begründet und kann nicht als Grundlage dienen für ein ganzes chronologisches System, dem die bestimmtesten Zeugnisse der römischen und abendländischen Tradition widersprechen. — Die scharfe Trennung der Periode des einfachen Gesangs von der Periode des verzierten Gesangs läuft Gefahr eines Tages sehr hart verurtheilt zu werden, da sie beinahe ganz ins Gebiet der Willkür gehört.» Vorerst tröste ich mich über die Härte des über mein Haupt verhängten Urtheils mit dem Gedanken, dass man mir wenigstens das Verdienst zuerkennen wird, zuerst einen Versuch gemacht zu haben, aus den Gemeinplätzen herauszukommen, mit denen man sich seit Jahrhunderten bezahlt, und wenigstens einige Grenzpfähle an diesem noch ungebahnten Wege einzurammen, kurzum zu einer rationellen Erklärung der stufenweisen Entwickelung des Schatzes der römischen Kirchengesänge zu gelangen. Wohl ist es möglich, dass die von mir aufgestellte Grenze der beiden Perioden späterhin als ungenau erkannt und dass sie auf Grund vertiefter Studien etwas vor- oder zurückgeschoben werden muss (ich prätendire nicht, gleich auf den ersten Schlag eine absolute Genauigkeit erzielt zu haben). Doch glaube ich, dass die historische Thatsächlichkeit der beiden einander folgenden Perioden unbestreitbar ist. Dieselbe ist nicht nur durch die musikalische Faktur der beiden Klassen von Gesängen erwiesen — ein Kriterium, das nicht lügen kann — sondern sie ist auch in auffälliger Weise durch die Musikgeschichte und die kirchliche Litteratur be-

glaubigt. Thatsächlich gehören alle Überbleibsel antiker Vokalmusik (die drei kitharodischen Melodien aus dem 2. Jahrhundert und das Melodiefragment der ersten Pindarischen Ode) derselben Art von Melodiebildung an wie die einfachen Antiphonen und Responsorien: auf jede Silbe kommen ein, zwei oder höchstens drei Töne. Andererseits beziehen sich die wenig eingehenden Aufschlüsse, die wir bei Schriftstellern vorkarolingischer Zeit — Cassiodor, St. Benedict, Beda — finden, einzig auf die Offizien der Tagzeiten,[1]) die durchaus nur im einfachen Stil komponiert sind (mit Ausnahme der Responsorien der Nokturnen), während im Gegentheil die Spezialbezeichnungen der fünf Messgesänge (Antiphona ad introitum, ad communionem, responsorium gradale, tractus, offertorium[2]) in keinem einzigen römischen Dokument vorkommen, das älter ist als der zur Zeit Hadrians I. redigirte Ordo Romanus I.

Ich erwarte daher, ehe ich mein chronologisches System aufgebe, dass man mir dessen Irrigkeit durch schlagende Gründe und unabweisbare Zeugnisse nachweist, nicht aber vermittelst «abgenutzter und unechter Trümmer», auf welche mein ehrwürdiger Gegner «mangels etwas bessern» angewiesen zu sein beklagt.[3])

Die *R. B.* gesteht ohne Beschwerde zu, dass die Entstehungsperiode der liturgischen Kunst kaum über das Jahr 700 hinaus gedauert hat. Aber sie kritisirt die induktive Methode, mit Hülfe deren ich dieses Datum erlangt habe und

1) Wir verweisen diesbezüglich auf eine interessante Stelle aus der Biographie des Papstes Vigil (537—555) in *Liber pontificalis* (Bd. I, S. 289). »Ingressus est Constantinopolim vigilias Domini nostri I. C. Obvius est ei imperator; osculantes se coeperunt flere; et plebs illa psallebat ante eum usque ad ecclesiam S. Sophiae: *Ecce advenit dominator Dominus*« etc. Diese Antiphon gehört zum Weihnachtsofficium des *Responsale gregorianum* der Benediktiner (S. 744); sie ist aus dem römischen Antiphonar verschwunden, aber das von Trier hat sie beibehalten.

2) Isidor von Sevilla erwähnt das *Offertorium* (Orig. l. VI. c. 19; Eccl. off. l. l. c. 14), aber es ist zu bemerken, dass zu dieser Zeit die spanische Kirche den gothischen Ritus befolgte, der dem gallicanischen verwandt war und dem liturgischen Gebrauch des Orients näher stand als dem römischen.

3) Sind der Dokumente aus erster Hand wirklich so wenige? Es scheint mir nicht. Schon allein der Umfang dieses Anhangs würde zum Beweise des Gegentheils hinreichen. Und wer weiss, wieviele eine richtig angelegte Durchforschung der unermesslich reichen kirchlichen Litteratur der 8 ersten Jahrhunderte der christlichen Aera noch an den Tag brächte?

bestreitet besonders, dass das Vorkommen bereits anderweit verwendeter Gesänge in einem Offiz als Anzeichen der abnehmenden musikalischen Produktivität angesehen werden könne. Gewiss könnte dies Kriterium, wenn man es unterschiedslos anwenden wollte, zu den irrigsten Schlussfolgerungen führen. So weist die *R. B.* sehr mit Recht auf Entlehnungen dieser Art in einigen Offizien hin, die im 7. Jahrhundert eingeführt sind, also in einer Zeit, die nach meiner Darstellung den Höhepunkt der Thätigkeit der liturgischen Komponisten bildet. Aber es ist zu bemerken, dass alle die angezogenen Beispiele dem *Heiligendienst (Proprium Sanctorum)* entnommen sind, für den von den ältesten Zeiten bis heute der Gebrauch überwogen hat, sich bei der Messe derselben liturgischen Gesänge für Heilige gleichen Ranges zu bedienen.[1]) Das *Proprium de Tempore* (der regelmässige *Gottes*dienst des Kirchenjahres) befolgt einen gegentheiligen Usus: hier hat — einige wenige durch die Geschichte der Liturgie leicht erklärte Fälle ausgenommen — jede der bereits im 7. Jahrhundert eingerichteten und daher zum gelasianischen Sakramentar gehörigen Messen ihre besonderen Gesänge (oder wenigstens Texte). Diese alte Praxis ist weniger streng eingehalten für die Messen der 23 Sonntage nach Pfingsten, deren Liturgie erst gegen 700 eingerichtet wurde; unter den 115 Gesangsstücken, welche diese Reihe von Offizien enthält, sind etwa zwanzig älteren Offizien entnommen. Schliesslich wurde diese überkommene Gewohnheit ganz oder doch beinahe aufgegeben für die Donnerstage der Fastenzeit, die erst seit Gregor II. (715—731) gefeiert wurden: von den 20 Gesangsstücken ihrer Messen sind 15 in andern Messen verstreut nachweisbar.

Ich bleibe daher dabei, zu glauben, das dies analytisch-statistische Vorgehen, im Lichte einer gründlichen Kenntniss des Kirchenkalenders und ausser den Melodien auch auf die Texte ausgedehnt, eins der wirksamsten Mittel zur Gewinnung einiger Anhaltspunkte für das relative Alter der verschiedenen Klassen von Melodien ist, oder wie man in Deutschland sagt, für die *interne* Geschichte des Kirchengesangs.

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1) Wie das eigentliche Antiphonar, so hat auch das Graduale (Liber gradualis) ein *Commune Sanctorum*, dessen Gebrauch ein sehr ausgedehnter ist, aber es hat nicht wie jenes ein *Commune de Tempore* (was doch der Wochenpsalter ist). Alle Messen des Commune Sanctorum sind ursprünglich für das Fest eines bestimmten Heiligen komponiert worden.

Die *R. B.* wirft mir noch vor, dass ich über den ambrosianischen Gesang nichts gesagt habe, dass ich «nichts ahnen lasse von seinen Beziehungen zum späteren römischen Gesange, ausgenommen was die Hymnen angeht.» Dafür ist die erste Entschuldigung die Lückenhaftigkeit meiner Kenntnisse: ich gestehe, dass ich nicht recht weiss, wie die Melodik der Antiphonen und anderer Gesänge des ambrosianischen Ritus beschaffen war, während der Jahrhunderte, mit welchen ich mich beschäftigt habe (weiss es mein ehrwürdiger Widersacher?). Als zweiten Grund meines Schweigens könnte ich den engen Rahmen meiner Arbeit anführen. In einer zum öffentlichen Vortrag bestimmten Abhandlung musste ich mich an eine einfache historische Skizze halten und andere meiner Ansicht nach noch wichtigere Fragen bei Seite lassen.

Endlich giebt die *R. B.* nicht zu, dass die italienischen Schriftsteller der karolingischen Zeit die Tendenz gehabt haben könnten, ihre Landsleute zu erheben und Ausländer zurückzusetzen. Zum Beweis, dass ich nicht ins Blaue hinein geredet, will ich nur an die anmassenden Ausfälle des Johannes Diaconus über die Leichtfertigkeit der französischen und die Ungeschlachtheit der deutschen Sänger erinnern, Ausfälle, die einem St. Gallener Schreiber folgenden naiven an den Rand seines Manuskripts verzeichneten Ausruf entlockten: *Ecce jactantiam Romanis consuetam in Teutones et Gallos*[1]) «das ist wieder die alte Schmähsucht der Römer gegen Teutonen und Gallier!») — Aber eine Diskussion über diesen Punkt würde mich zu weit führen und müsste diesen ohnehin schon allzugrossen Anhang ohne Noth noch verlängern.

Nur noch ein Wort zum Schluss. — Der Berichterstatter der *R. B.* glaubt in meinen Ideen den Einfluss *einer gewissen Schule* zu entdecken, «die bereits gerichtet ist» (das scheint mir wenigstens der Sinn der Worte zu sein). Ich weiss nicht, auf was für eine Schule diese Zeilen anspielen. Sollte mein ehr-

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1) *Mon. Germ. hist.* Bd. II, S. 102, § 47. Und doch konnten diese transalpinen Barbaren, die Zeitgenossen des Johannes Diaconus sich bereits mit einigen Stolz auf ihren Amalarius, Aurelian von Réomé, Regino von Prüm, Remigius von Auxerre und Hucbald berufen, während die Italiener noch über 100 Jahre auf ihren Guido von Arezzo warten mussten. Man frage sich, was aus der kirchlichen Kunst im 10. Jahrhundert geworden wäre, wenn das Monopol derselben bei der römischen Schola verblieben wäre!

würdiger Gegner damit — was ich zu glauben Anstand nehme — alle diejenigen meinen, die sich historischen Forschungen widmen, nicht um in denselben lediglich die Bestätigung vorgefasster Meinungen zu finden, sondern vielmehr, um ihre Meinungen den Ergebnissen ihrer Studien unterzuordnen, so würde die Achtung vor der Wahrheit mich verpflichten, zu bekennen, dass ich zu ihnen gehöre. Aber ich könnte nicht umhin, diese summarische Verurtheilung übermässig hart zu finden, da es sich um ganz unverfängliche Materien handelt, bei denen weder das Dogma noch die Moral irgendwie engagirt sind. Ein Thema wie das des christlichen Kirchengesangs, das gleichermassen den Kultus und die Kunst angeht, kann wie mir scheint nur gewinnen, wenn es abwechselnd von beiden Standpunkten aus betrachtet wird, einerseits durch Geistliche und andererseits durch gleich gewissenhafte Laien, die ebenso für das gemeinsame Objekt ihrer Studien interessirt sind. *Unicuique datur manifestatio Spiritus ad utilitatem.* Was kommt schliesslich auf die Verschiedenheit der Methoden und Prinzipien an, wenn das Ergebniss der gegensätzlich gerichteten Anstrengungen doch nur zum Ruhme der katholischen Kirche ausfallen kann, indem es ein helles Licht auf einen der zahllosen Dienste wirft, welche sie der abendländischen Kultur erwiesen hat, indem es an den kirchlichen Ursprung unserer europäischen Musik erinnert, die so recht eigentlich aus dem Herzen christlichen Empfindens heraus geboren ist!

Brüssel, im März 1890.

THE

HISTORY OF THE PIANOFORTE.

A PAPER READ BEFORE THE SOCIETY OF ARTS,

WEDNESDAY, MARCH 7TH, 1883,

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THE HISTORY OF THE PIANOFORTE.

As this paper is composed from a technical point of view, some elucidation of facts, forming the basis of it, is desirable before we proceed to the chronological statement of the subject. These facts are the strings, and their strain or tension; the sound-board, which is the resonance factor; and the bridge, connecting it with the strings. The strings, soundboard, and bridge are indispensable, and common to all stringed imstruments. The special fact appertaining to keyboard instruments is the mechanical action interposed between the player and the instrument itself. The strings, owing to the slender surface they present to the air, are, however powerfully excited, scarcely audible. To make them sufficiently audible, their pulsations have to be communicated to a wider elastic surface, the soundboard, which, by accumulated energy and broader contact with the air, reinforces the strings' feeble sound. The properties of a string set in periodic vibration are the best known of the phenomena appertaining to acoustics. The molecules composing the string are disturbed in the string's vibrating length by the means used to excite the sound, and run off into sections, the comparative length and number of which depend partly upon the place in the string the excitement starts from; partly upon the force and the form of force that is employed; and partly upon the length, thickness, weight, strain, and elasticity of the string, with some small allowance for gravitation. The vibrating sections are of wavelike contour; the nodes or points of apparent rest being really knots of the greatest pressure from crossing streams of molecules. Where the pressure slackens, the sections rise into loops, the curves of which show the points of least pressure. Now, if the string be struck upon a loop, less energy is communicated to the string, and the carrying power of the sound proportionately fails. If the string be struck upon a node, greater energy ensues, and the carrying power proportionately gains. By this we recognise the importance of the place of contact, or striking-place of the hammer against the string; and the necessity, in order to obtain good fundamental tone, which shall carry, of the note being started from a node.

If the hammer is hard, and impelled with force, the string breaks into shorter sections, and the discordant upper partials of the string, thus brought into prominence, make the tone harsh. If the hammer is soft, and the force employed is moderated, the harmonious partials of the longer sections strike the ear, and the tone is full and round. By the frequency of vibration, that is to say, the number of times a string runs through its complete changes one way and the other, say, for measurement, in a second of time, we determine the pitch, or relative acuteness of the tone as distinguished by the ear.

We know, with less exactness, that the sound-board follows similar laws. The formation of nodes is helped by the barring of the sound-board, a ribbing crosswise to the grain of the wood, which promotes the elasticity, and has been called the "soul" of stringed musical instruments. The sound-board itself is made of most carefully chosen pine; in Europe of the *Abies excelsa*, the spruce fir, which, when well grown, and of light even grain, is the best of all woods for resonance. The pulsations of the strings are communicated to the sound-board by the bridge, a thick rail of close-grained beech, curved so as to determine their vibrating lengths, and attached to the sound-board by dowels. The bridge is doubly pinned, so as to cut off the vibration at the edge of the bearing the strings exert upon the bridge. The shock of each separate pulsation, in its complex form, is received by the bridge, and communicated to such undamped strings as may, by their lengths, be sensitive to them; thus producing the Æolian tone commonly known as sympathetic, an eminently attractive charm in the tone of a pianoforte.

We have here strings, bridge, and sound-board, or belly, as it is technically called, indispensable for the production of the tone, and indivisible in the general effect. The proportionate weight of stringing has to be met by a proportionate thickness and barring of the sound-board, and a proportionate thickness and elevation of the bridge.

The tension of the strings is met by a framing, which has become more rigid as the drawing-power of the strings has been gradually increased. In the present concert grands of Messrs. Broadwood, that drawing-power may be stated as starting from 150 lb.

for each single string in the treble, and gradually increasing to about 300 lb. for each of the single strings in the bass. I will reserve for the historical description of my subject some notice of the different kinds of framing that have been introduced. It will suffice, at this stage, to say that it was at first of wood, and became, by degrees, of wood and iron; in the present day the iron very much preponderating. It will be at once evident that the object of the framing is to keep the ends of the strings apart. The near ends are wound round the wrest-pins, which are inserted in the wooden bed, called the wrest-plank, the strength and efficiency of which are most important for the tone and durability of the instrument. It is composed of layers of wainscot oak and beech, the direction of the grain being alternately longitudinal and lateral. Some makers cover the wrest-plank with a plate of brass; in Broadwood's grands, it is a plate of iron, into which, as well as the wood, the wrest-pins are screwed. The tuner's business is to regulate the tension, by turning the wrest-pins, in which he is chiefly guided by the beats which become audible from differing numbers of vibrations. The wrest-plank is bridged, and has its bearing like the sound-board; but the wrest-plank has no vibrations to transfer, and should, as far as possible, offer perfect insensibility to them.

I will close this introductory explanation with two remarks, made by the distinguished musician, mechanician, and inventor, Theobald Boehm, of Munich, whose inventions were not limited to the flute which bears his name, but include the initiation of an important change in the modern pianoforte, as made in America and Germany. Of priority of invention he says, in a letter to an English friend, "If it were desirable to analyse all the inventions which have been brought forward, we should find that in scarcely any instance were they the offspring of the brain of a single individual, but that all progress is gradual only; each worker follows in the track of his predecessor, and eventually, perhaps, advances a step beyond him." And concerning the relative value of inventions in musical instruments, it appears, from an essay of his which has been recently published, that he considers improvement in acoustical proportions the chief foundation of the higher or lower degree of perfection in all instruments, their mechanism being but of secondary value.

I will now proceed to recount briefly the history of the pianoforte from the earliest mention of that name, continuing it to our contemporary instruments, as far as they can be said to have entered into the historical domain. It has been my privilege to assist in proving that Bartolommeo Cristofori was, in the first years of the 18th century, the real inventor of the pianoforte, but with a wide knowledge and experience of how long it has taken to make any invention in keyed instruments practicable and successful, I cannot believe that Cristofori was the first to attempt to contrive one. I should rather accept his good and complete instrument as the sum of his own lifelong studies and experiments, added to those of generations before him, which have left no record for us as yet discovered.

The earliest mention of the name pianoforte *(piano e forte)*, applied to a musical instrument, has been recently discovered by Count Valdrighi in documents preserved in the Estense Library, at Modena. It is dated A.D. 1598, and the reference is evidently to an instrument of the spinet or cembalo kind; but how the tone was produced there is no statement, no word to base an inference upon. The name has not been met with again between the Estense document and Scipione Maffei's well-known description, written in 1711, of Cristofori's "gravecembalo col piano e forte." My view of Cristofori's invention allows me to think that the Estense "piano e forte" may have been a hammer cembalo, a very imperfect one, of course. But I admit that the opposite view of forte and piano, contrived by registers of spinet-jacks, is equally tenable.

Bartolommeo Cristofori was a Paduan harpsichord maker, who was invited by Prince Ferdinand dei Medici to Florence, to take charge of the large collection of musical instruments the Prince possessed. At Florence, he produced the invention of the pianoforte, in which he was assisted and encouraged by this high-minded, richly cultivated, and very musical Prince. Scipione Maffei tells us that in 1709, Cristofori had completed four of the new instruments, three of them being of the usual harpsichord form, and one of another form, which he leaves undescribed. It is interesting to suppose that Handel may have tried one or more of these four instruments during the stay he made at Florence in 1708. But it is not likely that he was at all impressed with the potentialities of the invention any more than John Sebastian Bach was in after years, when he tried the pianofortes of Silbermann. The sketch of Cristofori's action in

Maffei's essay, from which I have had a working model accurately made, shows that in the first instruments the action was not complete, and it may not have been perfected when Prince Ferdinand died in 1713. But there are Cristofori grand pianos preserved at Florence, dated respectively 1720 and 1726, in which an improved construction of action is found, and of this I also exhibit a model. There is much difference between the two. In the second, Cristofori had obtained his escapement with an undivided key, reconciling his depth of touch, or keyfall, with that of the contemporary harpsichord, by driving the escapement lever through the key. He had contrived means for regulating the escapement distance, and had also invented the last essential of a good pianoforte action, the check. I will explain what is meant by escapement and check. When, by a key being put down, the hammer is impelled towards the strings, it is necessary for their sustained vibration that, after impact, the hammer should rebound or escape; or it would, as pianoforte-makers say, "block," damping the strings at the moment they should sound. A dulcimer player gains his elastic blow by the free movement of the wrist. To gain a similarly elastic blow mechanically, in his first action, Cristofori cut a notch in the butt of his hammer, from which the escapement lever, "linguetta mobile," as he called it—"hopper," as we call it—being centred at the base, moved forward when the key was put down to the extent of its radius, and after the delivery of the blow returned to its resting-place by the pressure of a spring. The first action gave the blow with more direct force than the second, which had the notch upon what is called the underhammer, but was defective in the absence of any means to regulate the distance of the "go-off," or "escapement" from the string. In the second action, a small check before the hopper is intended to regulate it, but does so imperfectly. The pianoforte had to wait for 50 years for satisfactory regulation of the escapement.

In the first action, the hammer rests in a silken fork, dropping the whole distance of the rise of every blow. The check in the second action, the "paramartello," is next in importance to the escapement. It catches the back part of the hammer at different points of the radius, responding to the amount of force the player has used upon the key. So that, in repeated blows, the rise of the hammer is modified, and the notch is nearer to the returning hopper in proportionate degree.

I have given the first place in description to Cristofori's actions, instead of to the "cembalo" or instrument, to which they were applied, because piano and forte, from touch, became possible through them, and what else was accomplished by Cristofori was due, primarily, to the dynamic idea. He strengthened his harpsichord sound-board against a thicker stringing, renouncing the cherished sound-holes. Yet the sound-box notion clung to him, for he made openings in his sound-board rail for air to escape. He ran a string-block round the case, entirely independent of the sound-board, and his wrest-plank, which also became a separate structure, removed from the sound-board by the gap for the hammers, was now a stout oaken plank, which, to gain an upward bearing for the strings, he inverted, driving his wrest-pins through in the manner of a harp, and tuning them in like fashion to the harp. He had two strings to a note, but it did not occur to him to space them into pairs of unisons. He retained the equidistant harpsichord scale, and had, at first, under-dampers, later, over-dampers, which fell between the unisons thus equally separated. Cristofori died in 1731. He had pupils, one of whom made, in 1730, the "Rafael d'Urbino," the favourite instrument of the great singer Farinelli. The story of inventive Italian pianoforte making ends thus early, but to Italy the invention indisputably belongs.

The first to make pianofortes in Germany was the famous Freiberg organ-builder and clavichord maker, Gottfried Silbermann. He submitted two pianofortes to the judgment of John Sebastian Bach in 1726, which judgment was, however, unfavourable; the trebles being found too weak, and the touch too heavy. Silbermann, according to the account of Bach's pupil, Agricola, being much mortified, put them aside, resolving not to show them again unless he could improve them. We do not know what these instruments were, but it may be inferred that they were copies of Cristofori, or were made after the description of his invention, by Maffei, which had already been translated from Italian into German, by König, the court poet at Dresden, who was a personal friend of Silbermann. With the next anecdote which narrates the purchase of all the pianofortes Silbermann had made by Frederick the Great, we are upon surer ground. This well accredited occurrence took place in 1746. In the following year occurred Bach's celebrated visit to Potsdam, when he played upon one or more of these instruments. Burney saw and

described one in 1772. I had this one, which was known to have remained in the new palace at Potsdam until the present time unaltered, examined, and, by a drawing of the action, found it was identical with Cristofori's. Not, however, being satisfied with one example, I resolved to go myself to Potsdam, and being furnished with permission from H.R.H. The Crown Princess of Prussia, I was enabled in September, 1881, to set the question at rest of how many grand pianofortes by Gottfried Silbermann there were still in existence at Potsdam, and what they were like. At Berlin there are none, but at Potsdam, in the music-rooms of Frederick the Great, which are in the town palace, the new palace, and Sans Souci—left, it is understood, from the time of Frederick's death undisturbed—there are three of these Silbermann pianofortes. All three are, with unimportant differences having nothing to do with structure, Cristofori instruments, wrest-plank, sound-board, string-block, and action; the harpsichord scale of stringing being still retained. The work in them is undoubtedly good; the sound-boards have given in the trebles, as is usual with old instruments, from the strain; but I should say all three might be satisfactorily restored. Some other pianofortes seem to have been made in North Germany about this time, as our own poet Gray bought one in Hamburg in 1755, in the description of which we notice the desire to combine a hammer action with the harpsichord, which so long exercised men's minds.

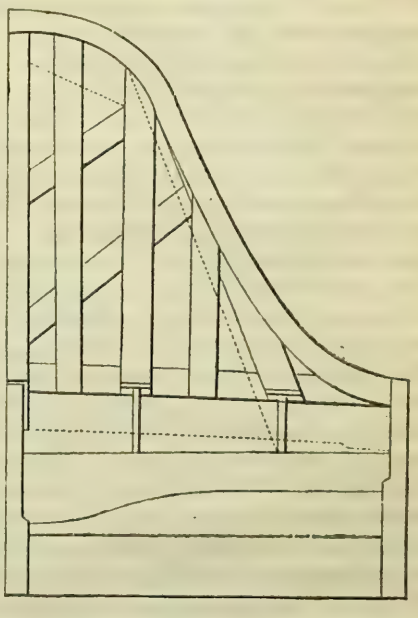
The Seven Years' War put an end to pianoforte-making on the lines Silbermann had adopted in Saxony. A fresh start had to be made a few years later, and it took place contemporaneously in South Germany and England. The results have been so important that the grand pianofortes of the Augsburg Stein, and the London Backers may be regarded, practically, as re-inventions of the instrument. The decade 1770-80 marks the emancipation of the pianoforte from the harpsichord, of which before it had only been deemed a variety. Compositions appear written expressly for it, and a man of genius, Muzio Clementi, who subsequently became the head of the pianoforte business now conducted by Messrs. Collard, came forward to indicate the special character of the instrument, and found an independent technique for it.

A few years before, the familiar domestic square piano had been invented. I do not think clavichords could have been altered to square pianos, as they were wanting in sufficient depth of case, but that the suggestion was from the clavichord is certain, the same kind of case and key-board being used. German authorities attribute the invention to an organ builder, Friederici of Gera, and give the date about 1758 or 1760. I have advertised in public papers, and have had personal inquiry made for one of Friederici's "Fort Bien," as he is said to have called his instrument. I have only succeeded in learning this much, that Friederici is considered to have been of later date than has been asserted in the text-books. Until more conclusive information can be obtained, I must be permitted to regard a London maker, but a German by birth, Johannes Zumpe, as the inventor of the instrument. It is certain that he introduced that model of square piano which speedily became the fashion, and was chosen for general adoption everywhere. Zumpe began to make his instruments about 1765. His little square, at first of nearly five octaves, with the "old man's head" to raise the hammer, and "mopstick" damper, was in great vogue, with but little alteration, for forty years; and that, in spite of the manifest improvements of John Broadwood's wrest-plank, and John Geib's "grasshopper." After the beginning of this century, the square piano became much enlarged and improved by Collard and Broadwood, in London, and by Petzold, in Paris. It was overdone in the attempt to gain undue power for it, and, about twenty years ago, sank in the competition with the later cottage pianoforte, which was always being improved.

To return to the grand pianoforte. The origin of the Viennese grand is rightly accredited to Stein, the organ builder, of Augsburg. I will call it the German grand, for I find it was as early made in Berlin as Vienna. According to Mozart's correspondence, Stein had made some grand pianos in 1777, with a special escapement, which did not "block" like the pianos he had played upon before. When I wrote the article "Pianoforte" in Dr. Grove's "Dictionary" no Stein instrument was forthcoming, but the result of the inquiries I had instituted at that time ultimately brought one forward, which has been secured by the curator of the Brussels Museum, M. Victor Mahillon. This instrument, with Stein's action and two unison scale, is dated 1780. Mozart's grand piano, preserved at Salzburg, made by Walther, is a nearly contemporary copy of Stein, and so also are the grands by Huhn of Berlin, which I took notes of at Berlin and Potsdam; the latest of these

is dated 1790. An advance, shown by these instruments of Stein and Stein's followers, is in the spacing of the unisons; the Huhn grands having two strings to a note in the lower part of the scale, and three in the upper. The Cristofori-Silbermann inverted wrest-plank has reverted to the usual form; the tuning pins and downward bearing being the same as in the harpsichord. There are no steel arches as yet between the wrest-plank and the belly-rail in these German instruments. As to Stein's escapement, his hopper was fixed behind the key; the axis of the hammer rising on a principle which I think is older than Stein, but have not been able to trace to its source, and the position of his hammer is reversed. Stein's light and facile movement with shallow key-fall, resembling Cristofori's in bearing little weight, was gratefully accepted by the German clavichord players, and, re-acting, became one of the determining agents of the piano music and style of playing of the Vienna school. Thus arose a fluent execution of a rich figuration and brilliant passage playing, with but little inclination to sonorousness of effect, lasting from the time of Mozart's immediate followers to that of Henri Herz; a period of half a century. Knee-pedals, as we translate "génouillères," were probably in vogue before Stein, and were levers pressed with the knees, to raise the dampers, and leave the pianoforte undamped, a register approved of by Carl Philip Emmanuel Bach, who regarded the undamped pianoforte as the more agreeable for improvising. He appears, however, to have known but little of the capabilities of the instrument, which seemed to him coarse and inexpressive beside his favourite clavichord. Stein appears to have made use of the "una corda" shift. Probably by knee-pedals, subsequently by foot-pedals, the following effects were added to the Stein pianos. The harpsichord "harp"-stop, which muted one string of each note by a piece of leather, became, by the interposition of a piece of cloth between the hammer and the strings, the piano, harp, or *celeste*. The more complete sourdine, which muted all the strings by contact of a long strip of leather, acted as the staccato, pizzicato, or pianissimo. The Germans further displayed that ingenuity in fancy stops, Mersenne had attributed to them in harpsichords more than a hundred and fifty years before, by a bassoon pedal, a card which, by a rotatory half-cylinder just impinging upon the strings, produced a reedy twang; also by pedals for triangle, cymbals, bells, and tambourine, the last drumming on the sound-board itself. Several of these contrivances may be seen in a six-pedal grand pianoforte belonging to Her Majesty the Queen, at Windsor Castle, bearing the name as maker of Stein's daughter, Nannette, who was a friend of Beethoven. The diagram represents the wooden framing of such an instrument.

Fig. 1.



We gather from Burney's contributions to "Rees's Cyclopædia," that after the arrival of John Christian Bach in London, A.D. 1759, a few grand pianofortes were attempted, by the second-rate harpsichord makers, but with no particular success. If the workshop tradition can be relied upon that several of Silbermann's workmen had come to London about that time, the so-called "twelve apostles," more than likely owing to the Seven Years' War, we should have here men acquainted with the Cristofori model, which Silbermann had taken up, and the early grand pianos referred to by Burney would be on that model. I should say the "new instrument" of Messrs. Broadwood's playbill of 1767 was such a grand piano; but there is small chance of ever finding one now, and if an instrument were found, it would hardly retain the original action, as Messrs. Broadwood's books of the last century show the practice of refinishing instruments which had been made with the "old movement." Burney distinguishes Ameri-

cus Backers by special mention. He is said to have been a Dutchman. Between 1772 and and 1776, Backers produced the well-known English action, which has remained the most durable, and one of the best up to the present day. It refers in direct leverage to Cristofori's first action. It is opposite to Stein's contemporary invention, which has the hopper fixed. In the English action, as in the Florentine, the hopper rises with the key. To the direct leverage of Cristofori's first action, Backers combined the check of the second, and then added an important invention of his own, a regulating screw and button for the escapement. Backers died in 1776. It is unfortunate we can refer to no pianoforte made by him. I should regard it as treasure trove if one were forthcoming in the same way that brought to light the authentic one of Stein's. As, however, Backers' intimate friends, and his assistants in carrying out the invention, were John Broadwood and Robert Stodart, we have, in their early instruments, the principle and all the leading features of the Backers' grand. The increased weight of stringing was met by steel arches placed at intervals between the wrest-plank and the belly-rail, but the belly-rail was still free from the thrust of the wooden bracing, the direction of which was confined to the sides of the case, as it had been in the harpsichord. Stodart appears to have preceded Broadwood in taking up the manufacture of the grand piano by four or five years. In 1777, he patented an alternate pianoforte and harpsichord, the drawing of which patent shows the Backers action. The pedals he employed were to shift the harpsichord register, and to bring on the octave stop. The present pedals were introduced in English and grand pianos by 1785, and are attributed to John Broadwood, who appears to have given his attention at once to the improvement of Backers' instrument. Hitherto the grand piano had been made with an undivided belly-bridge, the same as the harpsichord had been; the bass strings, in three unisons, to the lowest note, being of brass. Theory would require that the notes of different octaves should be multiples of each other, and that the tension should be the same for each string. The lowest bass strings, which at that time were the note F, would thus require a vibrating length of about twelve feet. As only half this length could be afforded, the difference had to be made up in the weight of the strings and their tension, which led, in these early grands, to many inequalities. The three octaves towards the treble could, with care, be adjusted, the lengths being practically the ideal lengths. It was in the bass octaves (pianos were then of five octaves) the inequalities were more conspicuous. To make a more perfect scale, and equalise the tension, was the merit and achievement of John Broadwood, who joined to his own practical knowledge and sound intuitions the aid of professed men of science. The result was, the divided bridge, the bass strings being carried over the shorter division, and the most beautiful grand pianoforte in its lines and curves that has ever been made was then manufactured. In 1791, he carried his scale up to C, five and a-half octaves; in 1794, down to C, six octaves, always with care for the artistic form. The pedals were attached to the front legs of the stand, on which the instrument rested. The right foot pedal acted first as the piano register, shifting the impact of each hammer to two unisons instead of three; a wooden stop in the right hand key-block permitted the action to be shifted yet further to the right, and reducing the blow to one string only, produced the pianissimo register, or *una corda*, of indescribable attractiveness of sound. The cause of this was in the reflected vibration through the bridge to the untouched strings. The present school of pianoforte playing rejects this effect altogether, but Beethoven valued it, and indicated its use in some of his great works. Steibelt called the *una corda* the *celeste*, which is more appropriate to it than Adam's application of this name to the harp-stop, by which the latter has gone ever since.

Up to quite the end of the last century, the dampers were continued to the highest note in the treble. They were like harpsichord dampers raised by wooden jacks, with a rail or stretcher to regulate their rise, which served also as a back touch to the keys. I have not discovered the exact year when, or by whom, the treble dampers were first omitted, thus leaving that part of the scale undamped. This bold act gave the instrument many sympathetic strings free to vibrate from the bridge when the rest of the instrument was played; each string, according to its length, being an aliquot division of a lower string. This gave the instrument a certain brightness or life throughout, an advantage which has secured its universal adoption. The expedients of an untouched octave string, and of utilising those lengths of wire that lie beyond the bridges, have been brought into notice of late years, but the latter was early in the century essayed by W. F. Collard. From difficulties of tuning,

owing to friction and other causes, the real gain of these expedients is small, and when we compare them with the natural resources we have always at command in the normal scale of the instrument, is not worth the cost. The inventor of the damper register opened a floodgate to such aliquot reinforcement as can be got in no other way. Each lower note struck of the undamped instrument, by excitement from the sound-board carried through the bridge, sets vibrating higher strings, which, by measurement, are primes to its partials; and each higher string struck calls out equivalent partials in the lower strings. Even partials above the primes will excite their equivalents up to the twelfth and double octave. What a glow of tone-colour there is in all this harmonic reinforcement, and who would now say that the pedals should never be used? By their proper use, the student's ear is educated to a refined sense of distinction of consonance and dissonance, and the intention and beauty of Chopin's pedal work becomes revealed.

The next decade, 1790-1800, brings us to French grand pianoforte making, which was then taken up by Sebastian Erard. This ingenious mechanic and inventor travelled the long and dreary road along which nearly all who have tried to improve the pianoforte have had to journey. He appears, at first, to have adopted the existing model of the English instrument in resonance, tension, and action, and to have subsequently turned his attention to the action, most likely with the idea of combining the English power of gradation with the German lightness of touch. Erard claimed, in the specification to a patent for an action, dated 1808, "the power of giving repeated strokes, without missing or failure, by very small angular motions of the key itself."

Once fairly started, the notion of repetition became the dominant idea with pianoforte-makers, and to this day, although less insisted upon, engrosses time and attention that might be more usefully directed. Some great players, from their point of view of touch, have been downright opposed to repetition actions. I will name Kalkbrenner, Chopin, and, in our own day, Dr. Hans von Bülow. Yet the Erard's repetition, in the form of Herz's reduction, is, at present, in greater favour in America and Germany, and is more extensively used, than at any previous period.

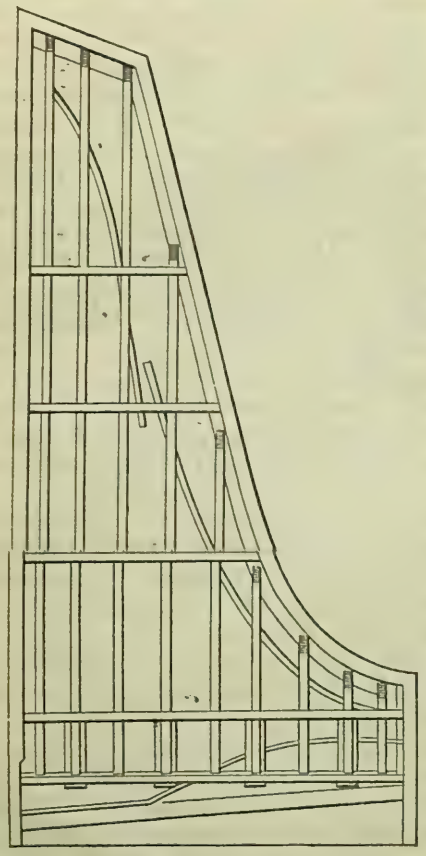
The good qualities of Erard's action, completed in 1821, the germ of which will be found in the later Cristofori, are not, however, due to repetition capability, but to other causes, chiefly, I will say, to counterpoise. The radical defect of repetition is that the repeated note can never have the tone-value of the first; it depends upon the mechanical contrivance, rather than the finger of the player, which is directly indispensable to the production of satisfactory tone. When the sensibility of the player's touch is lost in the mechanical action, the corresponding sensibility of the tone suffers; the resonance is not, somehow or other, sympathetically excited.

Erard re-discovered an upward bearing, which had been accomplished by Cristofori a hundred years before, in 1808. A down-bearing bridge to the wrest-plank, with hammers striking upwards, are clearly not in relation; the tendency of the hammer must be, if there is much force used, to lift the string from its bearing, to the detriment of the tone. Erard reversed the direction of the bearing of the front bridge, substituting for a long, pinned, wooden bridge, as many little brass bridges as there were notes. The strings passing through holes bored through the little bridges, called agraffes, or studs, turned upwards towards the wrest-pin. By this the string was forced against its rest instead of off it. It is obvious that the merit of this invention would in time make its use general. A variety of it was the long brass bridge, specially used in the treble on account of the pleasant musical box-like tone its vibration encouraged. Of late years another upward bearing has found favour in America and on the Continent, the Capo d'Astro bar of M. Bord, which exerts a pressure upon the strings at the bearing point.

About the year 1820, great changes and improvements were made in the grand pianoforte both externally and in the instrument. The harpsichord boxed-up front gave way to the cylinder front, invented by Henry Pape, a clever German pianoforte-maker who had settled in Paris. Who put the pedals upon the familiar lyre I have not been able to learn. It would be in the Empire time, when a classical taste was predominant. But the greatest change was from a wooden resisting structure to one in which iron should play an important part. The invention belongs to this country, and is due to a tuner named William Allen, a young Scotchman, who was in Stodart's employ. With the assistance of the foreman, Thom, the invention was completed, and a patent was taken out, dated the 15th of January, 1820, in which Thom was a partner. The patent was, however, at once

secured by the Stodarts, their employers. The object of the patent was a combination of metal tubes, with metal plates, the metallic tubes extending from the plates which were attached to the string-block to the wrest-plank. The metal plates now held the hitch-pins, to which the farther ends of the strings were fixed, and the force of the tension was, in a great measure, thrown upon the tubes. The tubes were a mistake; they were of iron over the steel strings, and brass over the brass and spun strings, the idea being that

Fig. 2.



William Allen.

of the compensation of tuning when affected by atmospheric change, also a mistake. However, the tubes were guaranteed by stout wooden bars crossing them at right angles. At once a great advance was made in the possibility of using heavier strings, and the great merit of the invention was everywhere recognised. James Broadwood was one of the first to see the importance of the invention, if it were transformed into a stable principle. He had tried iron tension bars in past years, but without success. It was now due to his firm to introduce a fixed stringed plate, instead of plates intended to shift, and in a few years to combine this plate with four solid tension bars, for which combination he, in 1827, took out a patent, claiming as the motive for the patent the string-plate; the manner of fixing the hitch-pins upon it, the fourth tension bar, which crossed the instrument about the middle of the scale, and the fastening of that bar to the wooden brace below, now abutting against the belly-rail, the attachment being effected by a bolt passing through a hole cut in the sound-board.

This construction of grand pianoforte soon became generally adopted in England and France. Messrs. Erard, who appear to have had their own adaptation of tension bars, introduced the harmonic bar in 1838. This, a short bar of gun-metal, was placed upon the wrest-plank immediately above the bearings of the treble, and consolidated the plank by screws tapped into it of alternate pressure and drawing power. In the original invention a third screw pressed upon the bridge. By this bar a very light ringing treble tone was gained. This was followed by a long harmonic bar extending above the whole length of the wrest-plank, which it defends from any tendency to rise, by downward pressure obtained by screws. During 1840-50, as many as five and even six tension-bars were used in grand pianofortes, to meet the ever-increasing strain of thicker stringing. The bars were strutted against a metal edging to the wrest-plank, while the ends were prolonged forward until they abutted against its solid mass on the key-board side of the tuning-pins. The space required for fixing them cramped the scale, while the strings were divided into separate batches between them. It was also difficult to so adjust each bar that it should bear its proportionate share of the tension; an obvious cause of inequality.

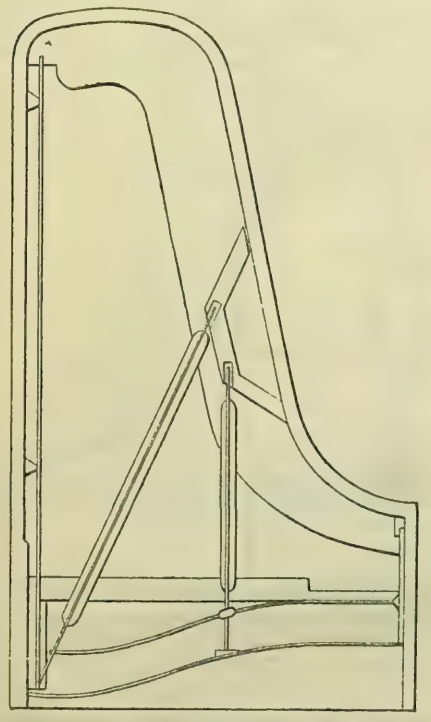
Towards the end of this period a new direction was taken by Mr. Henry Fowler Broadwood, by the introduction of an iron-framed pianoforte, in which the bars should be reduced in number, and with the bars the steel arches, as they were still called, although they were no longer arches but struts.

In a grand pianoforte, made in 1847, Mr. Broadwood succeeded in producing an instrument of the largest size, practically depending upon iron alone. Two tension-bars sufficed, neither of them breaking into the scale; the first, nearly straight, being almost parallel

with the lowest bass string; the second, presenting the new feature of a diagonal bar crossed from the bass corner to the string-plate, with its thrust at an angle to the strings.

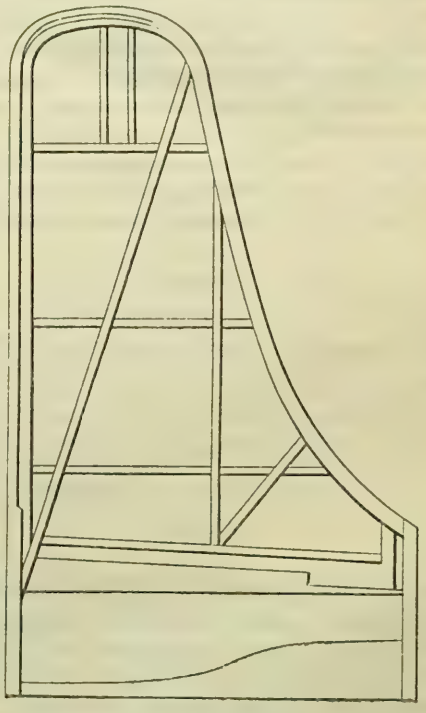
There were reasons which induced Mr. Broadwood to somewhat modify and improve this framing, but with the retention of its leading feature, the diagonal bar; which was found to be of supreme importance in bearing the tension where it is most concentrated. From 1852, his concert grands have had, in all, one bass bar, one diagonal bar, a middle bar with arch beneath, and the treble cheek bar. The middle bar is the only one directly crossing the scale, and breaking it. It is strengthened by feathered ribs, and is fastened by screws to the wooden brace below. The three bars and diagonal bar, which is also feathered, abut firmly on the string-plate, which is fastened down to the wooden framing by screws. Since 1862, the wooden wrest-plank has been covered with a plate of iron, the iron screw-pin plate, bent at a right angle in front. The wrest-pins are screwed into this plate, and again in the wood below. The agraffes, which take the upward bearings of the strings, are firmly screwed into this plate. The long harmonic bar, of gun metal, lies

FIG. 3.



BROADWOOD.

FIG. 4.



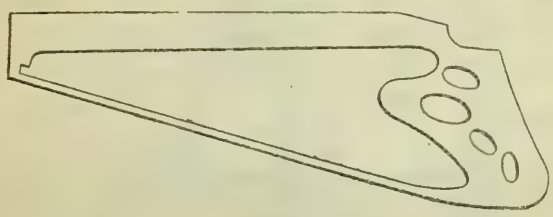
BROADWOOD.

immediately above the agraffes, and crossing the wrest-plank in its entire width, serves to keep it, at the bearing line, in position. This construction is the farthest advance of the English pianoforte.

Almost simultaneously with it has arisen a new development in America, which, beginning with Conrad Meyer, about 1833, has been advanced by the Chickerings and Steinways to the well-known American and German grand pianoforte of the present day. It was perfected in America about 1859, and has been taken up since by the Germans almost universally, and with very little alteration. Two distinct principles have been developed and combined—the iron framing in a single casting, and the cross or overstringing. I will deal with the last first, because it originated in England, and was the invention of Theobald Boehm, the famous improver of the flute. In "Grove's Dictionary" I have given an approximate date to his overstringing as 1835, but reference to Boehm's correspondence with Mr. Walter Broadwood shows me that 1831 was really the time, and that Boehm employed Gerock and Wolf, of 79, Cornhill, London, musical instrument makers, to carry out his experiment. Gerock being opposed to an oblique direction

of the strings and hammers, Boehm found a more willing coadjutor in Wolf. As far as I can learn, a piccolo, a cabinet, and a square piano were thus made over-strung. Boehm's argument was that a diagonal was longer within a square than a vertical, which, as he said, every school-boy knew. The first over-strung grand pianos seen in London were made by Lichtenthal, of St. Petersburg; not so much for tone as for symmetry of the case, two instruments so made were among the curiosities of the Great Exhibition of 1851. Some years before this, Henry Pape had made experiments in cross-stringing, with the intention to economise space. His ideas were adopted and continued by the London maker, Tomkisson, who acquired Pape's rights for this country. The iron framing in a single casting is a distinctly American invention, but proceeding, like the over-stringing, from a German by birth. The iron casting for a square piano of the American Alpheus Babcock, may have suggested Meyer's invention; it was, however, Conrad Meyer who,

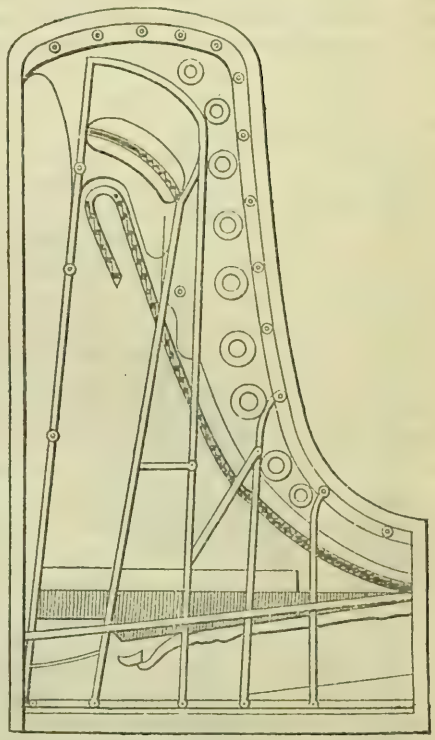
Fig. 5.



Meyer.

in Philadelphia, and in 1833, first made a real iron frame square pianoforte. The gradual improvement upon Meyer's invention, during the next quarter of a century, are first due to the Chickerings and then the Steinways. The former over-strung an iron frame square, the latter over-strung an iron frame grand, the culmination of this special make since of general American and German adoption. It will be seen that, in the American make, the number of tension bars has not been reduced, but a diagonal support has, to a certain extent, been accepted and adopted. The sound-board bridges are much further apart than obtains with the English grand, or with the Anglo-French Erard. The advocates of the American principle point out the advantages of a more open scale, and more equal pressure on the sound-board. They likewise claim, as a gain, a greater tension. I have no quite accurate information as to what the sum of the tension may be of an American grand piano. One of Broadwood's, twenty years ago, had a strain of 16½ tons; the strain has somewhat increased since then. The remarkable improvement in wiredrawing which has been made in Birmingham, Vienna, and Nuremberg of late years, has rendered these high tensions of far easier attainment than they would have been earlier in the century.

Fig. 6.



Steinway.

For me, the great drawback to one unbroken casting, is in the vibratory ring inseparable from any metal system that has no resting places to break the uniform reverberation proceeding from metal. We have already seen how readily the strings take up vibrations, which are only pure when, as secondary vibrations, they arise by reversion from the sound-board. If vibration arises from imperfectly elastic wood, we hear a dull wooden thud; if it comes from metal, partials of the strings are reinforced that should be left undeveloped, which give a false ring to the tone, and an after-ring that blurs *legato* playing, and nullifies the *staccato*. I do not pose as the obstinate advocate of parallel stringing, although I believe that, so

far, it is the most logical and the best; the best, because the left-hand division of the instrument is free from a preponderance of dissonant high partials, and we hear the light and shade, as well as the *cantabile* of that part, better than by any overstrung scale that I have yet met with. I will not, I say, offer a final judgment, because there may come a possible improvement of the over-strung or double diagonal scale, if that scale is persisted in, and inventive power is brought to bear upon it, as valuable as that which has carried the idea thus far.

I have not had time to refer other than incidentally to the square pianoforte, which has become obsolete. I must, however, give a separate historical sketch of the upright pianoforte, which has risen into great favour and importance, and in its development—I may say its invention—belongs to this present

the inventor of ever-pointed pencils, a civil engineer, poet, preacher, and phrenologist. While living at Border Town, New Jersey, U.S.A., Hawkins invented the cottage piano; portable grand he called it, and his father, Isaac Hawkins, to whom, in Grove's "Dictionary," I have attributed the invention, took out, in the year 1800, the English patent for it. I can fortunately show you one of these original pianinos, which belongs to Messrs. Broadwood; it is a wreck, but you will discern that the strings descend nearly to the floor, while the key-board, a folding one, is raised to a convenient height between the floor and the upper extremities of the strings. Hawkins had an iron frame and tension rods, within which the belly was entirely suspended; a system of tuning by mechanical screws; an upper metal bridge; equal length of string throughout; metal supports to the action in which a later help to repetition was anticipated—the whole instrument being independent of the case. Hawkins tried also a lately revived notion of coiled strings in the bass, doing away with tension. Lastly, he sought for a *sostinente*, which has been tried for from generation to generation, always to fail, but which, even if it does succeed, will produce another kind of instrument, not a pianoforte, which owes so much of its charm to its unsatiating, evanescent tone.

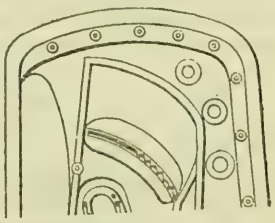
Once introduced into Hawkins's native country, England, the rise of the upright piano became rapid. In 1807, at latest, the now obsolete high cabinet piano was fairly launched. In 1811, Wornum produced a diagonal; in 1813, a vertical cottage piano. Previously, essays had been made to place a square piano upright on its side, for which Southwell, an Irish maker, took out a patent

model of the original crank action, but Mr. Wornum has favoured me with an early engraving of his father's invention. It was originally intended for the high cabinet piano, and a patent was taken out for it in 1826. But many difficulties arose, and it was not until 1829 that the first cabinet was so finished. Wornum then applied it, in the same year, to the small upright—the piccolo, as he called it—the principle of which was, through Pleyel and Pape, adopted for the pianino manufacture in Paris. Within the last few years we have seen the general introduction of Bord's little pianino, called in England, ungrammatically enough, pianette, in the action of which that maker cleverly introduced the spiral spring. And, also, of those large German over-strung and double over-strung upright pianos, which, originally derived from America, have so far

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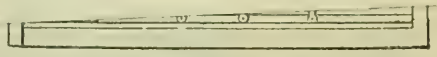
FIG. 6.



CORRECTION.

Since the paper was printed, I have found out that John Isaac Hawkins was at Philadelphia when he communicated his invention to his father. (See p. 13, col. 1, line 40.) He settled at Bordenton a few years later.

A. J. H.



STEINWAY.

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I have not had time to refer other than incidentally to the square pianoforte, which has become obsolete. I must, however, give a separate historical sketch of the upright pianoforte, which has risen into great favour and importance, and in its development—I may say its invention—belongs to this present 19th century. The form has always recommended the upright on the score of convenience, but it was long before it occurred to anyone to make an upright key-board instrument reasonably. Upright harpsichords were made nearly four hundred years ago; a very interesting 17th century one was sold lately in the great Hamilton sale—sold, I grieve to say, to be demolished for its paintings. But all vertical harpsichords were horizontal ones, put on end on a frame; and the book-case upright grand pianos, which, from the eighties, were made right into the present century, were horizontal grands similarly elevated. The real inventor of the upright piano, in its modern and useful form, was that remarkable Englishman, John Isaac Hawkins, the inventor of ever-pointed pencils; a civil engineer, poet, preacher, and phrenologist. While living at Border Town, New Jersey, U.S.A., Hawkins invented the cottage piano; portable grand he called it, and his father, Isaac Hawkins, to whom, in Grove's "Dictionary," I have attributed the invention, took out, in the year 1800, the English patent for it. I can fortunately show you one of these original pianinos, which belongs to Messrs. Broadwood; it is a wreck, but you will discern that the strings descend nearly to the floor, while the key-board, a folding one, is raised to a convenient height between the floor and the upper extremities of the strings. Hawkins had an iron frame and tension rods, within which the belly was entirely suspended; a system of tuning by mechanical screws; an upper metal bridge; equal length of string throughout; metal supports to the action in which a later help to repetition was anticipated—the whole instrument being independent of the case. Hawkins tried also a lately revived notion of coiled strings in the bass, doing away with tension. Lastly, he sought for a *sostinente*, which has been tried for from generation to generation, always to fail, but which, even if it does succeed, will produce another kind of instrument, not a pianoforte, which owes so much of its charm to its unsatiating, evanescent tone.

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met with favour and sale in this country as to induce some English makers, at least in the principle, to copy them.

I will conclude this historical sketch by remarking, and as a remarkable historical fact, that the English firms which in the last century introduced the pianoforte, to whose honourable exertions we owe a debt of gratitude, with the exception of Stodart, still exist, and are in the front rank of the world's competition. I will name Broadwood (whose flag I serve under), Collard (in the last years of the last century known as Longman and Clementi), Erard (the London branch), Kirkman, and, I believe, Wornum. On the Continent, there is the Paris Erard house; and, at Vienna, Streicher, a firm which descends directly from Stein of Augsburg, the inventor of the German pianoforte, the favourite of Mozart, and of Beethoven in his virtuoso period, for he used Stein's grands at Bonn. Distinguished names have risen in the present century, some of whom have been referred to. To those already mentioned, I should like to add the names of Hopkinson and Brinsmead in England; Bechstein and Blüthner in Germany; all well-known makers.

DISCUSSION.

Mr. EAVESTAFF thought it was not made sufficiently plain in the paper that the credit of inventing the iron pianoforte belonged to an Englishman (Hawkins). He had himself seen a Hawkins's pianoforte made with an iron frame in 1806 or 1808, and his father knew Hawkins well. He did not think, therefore, the Americans should have the credit of the iron pianoforte.

The CHAIRMAN said Mr. Hipkins only gave the Americans the credit of making the iron frame in one casting. It was distinctly stated that Hawkins was an Englishman.

Mr. CHALLEN said he had listened with very great pleasure to the paper, many portions of which he could confirm if it were necessary, but he did not know that he could contribute much further information on the subject. One point occurred to him with regard to the introduction of cross-stringing by Tomkisson. He knew him intimately as a young man, and his impression was, that he introduced this cross-stringing somewhere about 1830, or even earlier. He did not himself remember it at that date, but he did very shortly afterwards.

The CHAIRMAN said he supposed it must be taken as a compliment to Mr. Hipkins that no one came forward to contest anything he had advanced. He had pointed out several particulars in which Englishmen were entitled to credit where it was not generally given to them, and there might be other cases in which some present might be able to show that Englishmen had contributed to the improvement of the pianoforte. It not unfrequently happened, he believed, that Englishmen made the preliminary steps in an invention, the credit of which was afterwards carried off by someone else. Very few people, when they went into a room and sat down to a pianoforte, had the least notion of the enormous amount of labour and science which had been expended on it; and he felt sure that many, on reading this excellent paper, would be glad to examine an instrument, and see how the various remarks applied. He feared, from the pianoforte being such a common instrument, that many persons were apt to overlook its real value.

Mr. HIPKINS then exhibited and explained the different pianoforte actions, including the Erard and Steinway.

Mr. HIPKINS said there was no doubt Tomkisson got the idea from Pape, in Paris; but he could not be quite sure who was the first to introduce it in England; he believed it was Boehm, but was not certain.

The CHAIRMAN then proposed a cordial vote of thanks to Mr. Hipkins for his paper, which displayed a large amount of careful historical research, and was remarkable for the perfect fairness and impartiality with which he had dealt with the whole subject.

The vote of thanks was carried unanimously, and the proceedings terminated.

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THÉORIE DE LA MUSIQUE

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PAR

D. DE LANGE

DIRECTEUR DU CONSERVATOIRE DE MUSIQUE D'AMSTERDAM



PARIS

LIBRAIRIE FISCHBACHER

(SOCIÉTÉ ANONYME)

33, RUE DE SEINE, 33

1908

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AVANT-PROPOS

En publiant cet essai sur la théorie générale de la musique, je sens le besoin de remercier chaleureusement mon ami et cher collègue Gustave Sandré, pour le secours qu'il m'a prêté.

Sans son aide, mon petit ouvrage n'aurait pu avoir la précision et la netteté d'expression qui, à ce que j'espère, et grâce à sa collaboration, en seront un des avantages les plus précieux.

DANIEL DE LANGE

INTRODUCTION

Depuis plus de trente ans la question de l'éducation musicale m'a tout particulièrement intéressé. C'est à partir de 1870 que, les classes théoriques du Conservatoire d'Amsterdam m'ayant été confiées, j'ai commencé à faire une étude approfondie du développement de cette éducation spéciale. Dans les pages suivantes je vais tâcher de résumer les observations que j'ai faites à ce sujet au cours de ma longue carrière.

Il est intéressant de signaler la différence qu'il y a entre l'instruction musicale donnée en France, en Italie et en Allemagne. (Dans les autres pays on suit, généralement, la tendance d'une de ces trois nations.) Entre la France et l'Italie la différence est beaucoup moins sensible qu'elle ne l'est avec l'Allemagne. On est donc en droit de dire qu'au point de vue général il existe deux *courants* que nous nommerons, l'un: « le courant latin », l'autre: « le courant germanique ».

En quoi consiste et d'où provient la différence entre ces deux courants? Pour résoudre cette question il est indispensable de remonter aux origines naturelles de l'Art musical européen.

Il est certain que toute musique a pour origine *la poésie*, l'art de la parole, et *la danse* l'art du geste. Chez les peuples primitifs ce dernier paraît avoir, seul, été connu; il a pour base *le rythme*.

Chez les peuples plus civilisés de l'antiquité la musique apparaît comme *une amplification de la parole*. Néanmoins l'élément primitif, le rythme, conserve un rôle important dans les danses mimées introduites dans les drames poétiques; mais les intonations musicales appliquées à la parole, aux mots, n'étaient soumises à d'autre symétrie rythmique que celle qui résultait de la parole elle-même.

Au commencement de l'ère chrétienne la musique que nous reconnaissons comme base de notre Art moderne doit être encore considérée comme une amplification de la parole et non comme un art *existant par lui-même*, ayant son indépendance. Or, si l'on compare la poésie des peuples germaniques avec celle des peuples d'origine latine on peut constater que, dans cette dernière, l'influence rythmique de la parole sur la musique est assez faible, secondaire, tandis que la première est, au contraire, basée sur un sentiment rythmique bien accentué, nettement défini, *qui impose ses lois* à la musique. La conséquence naturelle de ceci est que chez les peuples d'origine latine l'instinct de la symétrie rythmique s'est peu développé, est resté, en quelque sorte, *accessoire*, alors que chez les peuples germaniques cet instinct s'est de plus en plus affermi et a pris une importance capitale.

De ce fait résultent les deux « courants » dont nous avons parlé ci-dessus, ou, si l'on veut, deux espèces de musique séparées par des différences fondamentales. L'art latin a presque toujours besoin de s'appuyer sur la parole pour être complet; l'art germanique ayant plutôt le rythme

pour base a pu arriver à se suffire à lui-même. Donc, la musique ayant pour but de *souligner* la parole ne pouvait avoir de développement sérieux qu'en suivant le courant latin, tandis que la musique indépendante, *existant par elle-même*, devait résulter du courant germanique.

En consultant l'histoire générale de la musique on peut voir que chez les Grecs l'art musical *indépendant* n'existait pas et qu'il en fut ainsi durant toute la période du développement de la mélodie, depuis l'antiquité jusqu'au XII[e] siècle; que de cette époque jusqu'au XVII[e] siècle on ne trouve que de bien faibles tentatives pour libérer la musique de la tyrannie de la parole et que ce n'est qu'à partir de ce moment qu'un art musical spécial, *la musique instrumentale* (qui n'est autre chose que la musique de danse idéalisée) commence à exister et à se développer rapidement.

Bien que l'on trouve des germes de cet art en France et en Italie, à l'époque dont nous parlons, on ne peut nier que les Allemands aient été tout particulièrement favorisés dans leurs essais en ce genre par leur langue qui leur fournissait des types de symétrie rythmique qui manquaient aux autres peuples. Entre le rythme régulier (celui de la danse) et les accents de la parole il y a toujours eu concordance parfaite chez les Germains; chez les descendants des Latins ces deux éléments ont toujours été en guerre ouverte. De là, encore une fois, une différence radicale, absolue entre les deux tendances artistiques.

Il est vrai que depuis quelque temps cette différence tend à disparaître. Depuis les œuvres de la période Wagner-Liszt les compositeurs allemands semblent renier les formes régulières de la danse pour se livrer à une sorte d'improvisation continue qui exclut toute symétrie. Par contre, les musiciens d'origine latine cherchent à donner à leurs œuvres une forme plus précise que ne l'ont fait leurs prédécesseurs. Arriveront-ils à une union parfaite entre le rythme de la Danse idéalisée et le rythme de la Poésie? Il serait difficile de répondre à cette question en ce moment. Ce qui semble

certain c'est qu'à l'époque actuelle tous les efforts tendent à amener une fusion aussi intime que possible entre la poésie et la musique. Pour atteindre ce but il faut, évidemment, que les deux arts soient cultivés autrement qu'ils ne l'ont été jusqu'ici. Comme c'est spécialement du développement de la musique que je m'occupe, je tâcherai de donner, dans ce livre, un aperçu de certaines idées qui me sont personnelles, sous le titre de : *Exposé d'une théorie de la musique en rapport avec le développement de cet art à notre époque.*

EXPOSÉ D'UNE THÉORIE DE LA MUSIQUE

EN RAPPORT AVEC LE DÉVELOPPEMENT DE CET ART A NOTRE ÉPOQUE

I

Il faut admettre comme règle générale de tout développement intellectuel que chaque individu, pris en particulier, doit passer rapidement par une série de phases successives semblables à celles par lesquelles l'humanité a passé pendant le cours des siècles. Ainsi personne ne peut nier qu'il est naturel à l'enfant de commencer par ramper sur le sol avant de marcher et de danser. Qu'il lui est également naturel de commencer par articuler quelques sons confus avant de prononcer des syllabes et des mots, de parler, enfin. Or, en ce qui concerne l'éducation musicale on a, jusqu'à présent, suivi une autre voie. Au lieu de laisser aux petits enfants (de deux à cinq ans, par exemple) la liberté de crier, de chantonner juste ou faux, peu importe, au lieu de chercher à leur faire retenir des petites mélodies tout à fait simples, voici ce qui se passe le plus généralement :

Ou bien l'enfant n'entend pas de musique du tout ou bien il entend de grandes œuvres compliquées, nullement à la portée de son intelligence, que ses parents étudient au piano. Ici, il est indispensable de s'arrêter un instant.

Le piano étant de tous les instruments le plus imparfait au point de vue de *l'intonation*, *des nuances* et *de l'expression*, il est très important de ne point s'en servir pendant la première éducation musicale des enfants et de ne faire entendre à ceux-ci que des mélodies chantées par la voix ou jouées par un instrument à archet, violon, violoncelle, etc. Mais la voix étant, plus encore que ces derniers, l'instrument capable de produire toutes les nuances, c'est d'elle seule que l'on devrait se servir pour initier les jeunes intelligences aux premiers secrets de l'art sublime qui est: « la Musique »!

Il y aura certainement bon nombre de lecteurs qui trouveront cette exigence excessive. Pourtant que penserait-on d'un professeur de langues qui enseignerait la prononciation à l'aide d'un phonographe? On rirait, probablement. Et cependant il faut reconnaître que la reproduction, par le phonographe, des sons du langage parlé est bien supérieure à la reproduction des sons musicaux par un instrument à clavier. — Pourquoi, dira-t-on? — Parce que le phonographe reproduit *exactement* toutes les nuances, toutes les inflexions de voix de la personne dont il a enregistré les paroles, tandis que les instruments de musique dits: « à sons fixes » ne peuvent produire qu'un certain nombre de sons en dehors desquels les intonations *réelles* sont impossibles.

Mais peut-on, en musique, se servir de toutes les nuances d'intonations qu'elle possède? Si l'on prend comme moyen d'expression un instrument quelconque, la réponse est négative. Si, au contraire, on prend la voix humaine comme type, la réponse est affirmative.

Laquelle de ces deux bases est la vraie?

Il me semble qu'il ne peut y avoir de doute.

Peut-on s'imaginer un Zoulou exprimant ses sensations de joie, de tristesse, de haine ou d'amour sur un de nos pianos à queue ou sur un violon? Non. Cet habitant de l'Afrique criera, hurlera (même quand, selon lui, il chantera) pour rendre toutes ses sensations. C'est à peine si l'on peut admettre qu'il se servira d'un rythme, car il se bornera à frapper du pied ou des mains à tort et à travers.

Pour l'homme non civilisé la musique ne peut être que

l'exagération du langage ordinaire. Mais même parmi les hommes civilisés il n'y en a guère qui, au moment où ils seront sous l'influence de sensations violentes, joie, tristesse, iront se mettre au piano pour les exprimer, à moins que ce ne soient des musiciens, très cultivés, habitués à chercher dans la musique le moyen de donner une forme extérieure à leurs sentiments intimes. Non, à part ceux-là, tous les autres ne trouveront que des cris, des exclamations qui seront en rapport avec ce qu'ils ressentent et ces cris, ces exclamations doivent être considérés comme l'embryon, l'élément primitif de ce qu'on nomme « Musique ».

S'il en est ainsi l'art musical ne peut être considéré que comme une langue spéciale dont le chant est la base. Examinons, maintenant, si l'histoire du développement de l'Art musical confirme cette assertion.

II

En dehors de ce qui vient d'être démontré il est nécessaire de faire l'étude, au point de vue purement technique, de la musique chez les anciens et chez les peuples sans aucune civilisation.

Chez ces peuples on trouve un groupe de sons, une « Mélodie type » ou « gamme » dans laquelle la relation des sons entre eux est absolument semblable. Les historiens qui nous ont fait connaître cette gamme l'ont traduite, en notation moderne, de la manière suivante :



soit une gamme sans *sous-dominante* et sans *note sensible*.

De prime abord cette traduction me parut erronée. Comment admettre une musique dans laquelle rien ne désigne la Tonique? En outre, tout ce qui a été dit sur les modes « Chromatique » et « Enharmonique » des Grecs ne pouvait que nous amener à des équivoques extraordinaires. Mais le hasard m'a servi heureusement dans les recherches que je me proposais d'entreprendre sur ce sujet.

En 1878 une bande de musiciens javanais est venue en Hollande : C'était « l'orchestre de la Cour du Prince de Solo ». Parmi les instruments dont se servaient ces « artistes » des Indes Orientales, plusieurs étaient accordés dans le mode

« Stendro », mot qui signifie : *Carcasse.* Les autres modes javanais nommés : « Barang », « Miring », etc., sont des variétés du mode « Stendro ». Quelques professeurs (MM. Land, Figée, Loman) et moi nous avons fait le calcul exact des sons dont se compose le « Stendro » et nous avons trouvé que ce mode est formé par deux quartes justes entre lesquelles est intercalé le septième son des harmoniques, soit 6 7 $\frac{6}{8}$ 7 8 ou :



Comment expliquer ces rapports de sons qui paraissent impossibles pour notre oreille ?[1] L'explication est moins difficile qu'on ne croirait au premier abord.

La traduction des notes de ce mode par des musiciens européens nous démontre que ceux-ci en entendant les mélodies chantées ou jouées dans ce mode prenaient le rapport entre 6 et 7 pour *une seconde majeure.* Si nos musiciens n'étaient pas choqués par la petite différence qui existe, il n'en est pas moins certain que les oreilles javanaises doivent admettre le rapport de 6 à 7 et de 7 à 8 comme la succession de sons la plus naturelle.

Mais il y a plus. Si l'on fait écrire par des enfants une mélodie quelconque, dictée avec la voix, et que dans cette mélodie se trouve l'intervalle *mi-sol* ou *sol-fa-sol*, il y aura toujours parmi ces enfants quelques-uns d'entre eux qui se tromperont quant au *mi* ou au *fa*, *à moins qu'on ne chante le mi aussi bas que possible.*

Pendant vingt ans, à peu près, j'ai été à même de constater ce fait dans les cours que j'organisais pour étudier, moi-même, les bases de la théorie fondamentale de la musique. C'est par de telles expériences que j'ai été conduit à constater que les connaissances musicales des peuples qui

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[1] Remarquons que dans les livres qui traitent de la musique javanaise le mode « Stendro » a été traduit par les mêmes notes que celles de la gamme chinoise, nègre, etc.

sont restés en dehors de la civilisation européenne sont, à peu près, au même niveau que celles d'un de nos enfants de 10 à 12 ans. Voici une explication rationnelle de quelques autres faits :

Si nous admettons la succession de cinq tons indiquée ci-dessus (6 7 $\frac{6}{8}$ 7 8), le mode chromatique et le mode enharmonique des Grecs nous paraîtront tout naturels.

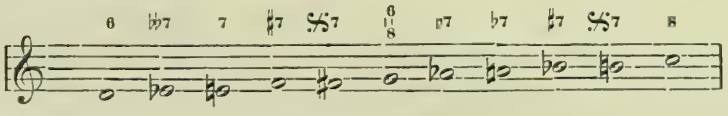
Transcription des trois modes :



naturel



chromatique



enharmonique

Je crois avoir suffisamment démontré par ce qui précède :

1° Qu'une théorie générale de la musique doit être basée sur *le chant* et non sur la musique instrumentale;

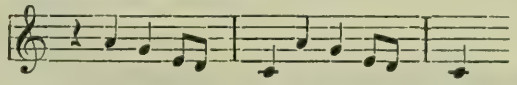
2° Que *la mélodie*, non l'harmonie, est l'élément fondamental de la musique;

3° Que dans la mélodie les rapports 5, 6[1], 7, 8, 9, 10, 15 et 16 (harmoniques) ont un rôle important;

4° Que plus l'Art se développe plus on se sert (et plus, peut-être, on se servira) d'intervalles plus compliqués pris dans les harmoniques;

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[1] Faisons remarquer que les rapports 6, 7, 8, ont un rôle important à notre époque. Exemple :



Cette phrase de Wagner ne pourrait s'expliquer si on ne considérait pas le *la* comme 7e son harmonique du son fondamental : *do*. Comme « sixte ajoutée » ce *la* serait faux.

5° Que même dans la musique des peuples peu civilisés la quarte juste est le rapport le plus rationnel;

6° Qu'après chaque intervalle de quarte on trouve une tonique nouvelle;

7° Que la théorie des Grecs n'admettait, comme la nôtre, que deux modes, savoir : le mode *diatonique* et le mode *chromatique*.

III

Pour se rendre compte de ce qu'est la musique *comme langue*, il faut commencer par la comparer à la langue usuelle, la langue parlée.

Que de nuances il y a dans les voyelles *a*, *e*, *i*, *o*, *u*, qui dans chaque langue ont un son particulier!

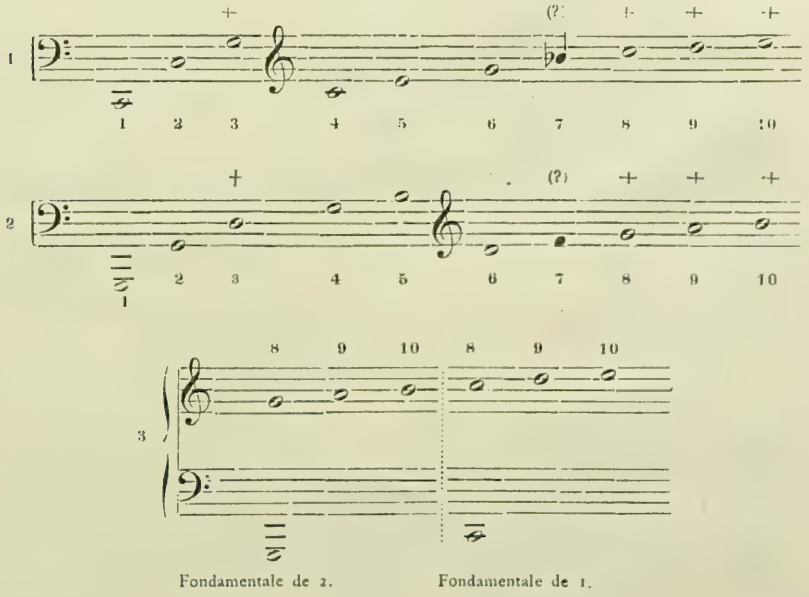
Il n'en est pas autrement en musique et, pourtant, les théoriciens persistent dans l'idée d'un *son fixe, absolu*, comme point de départ de toute théorie musicale, alors que, comme dans les langues parlées, les intonations varient à l'infini!

Si on songe aux changements que subissent les voyelles selon leur emploi dans telle ou telle langue, on comprendra qu'un instrument, fût-il le plus parfait, ne peut reproduire qu'une faible partie de changements analogues dans les sons. Un seul exemple suffira pour démontrer cette assertion. — Analysons une gamme:

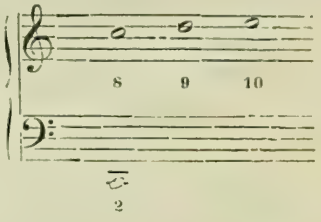
Le 1er degré, le 2^{me} et le 3^{me} sont issus des 8^{me}, 9^{me} et 10^{me} harmoniques d'un son fondamental quelconque. Prenant la quinte (3^{me} harmonique de ce son) *comme nouveau son fondamental* et employant les 8^{me}, 9^{me} et 10^{me} harmoniques qui en résultent on obtiendra, en adjoignant ces sons aux trois premiers, une série de six sons consécutifs qui formeront l'*hexachorde* des Anciens.

Comme, toutefois, il serait impossible de savoir lequel des deux sons fondamentaux doit avoir le rôle de tonique, il est nécessaire d'ajouter une troisième série aux deux précédentes. Cette série nouvelle doit être, avec la première,

dans le même rapport (*mais à l'opposé*) que la seconde avec la première. On n'a donc qu'à considérer la première série comme si elle était la seconde pour obtenir le résultat suivant, exposé en notation :

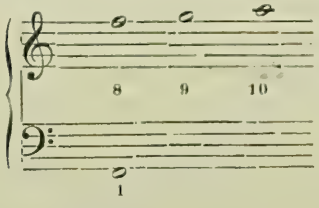


Si, maintenant, on considère comme 2me série :



do peut être la fondamentale de 2,

et :

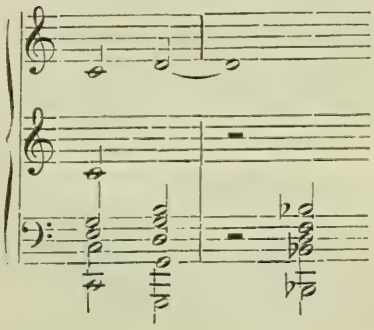


deviendra nécessairement 1re série et la fondamentale de 1 sera *fa*.

On voit que la formation théorique de la gamme est une chose très compliquée. La complication devient plus

grande encore si on poursuit l'analyse de plus près. Les trois sons que nous avons pris comme point de départ ne sont pas séparés l'un de l'autre par une égale distance L'intervalle entre les sons 8 et 9 est plus grand que celui qui se trouve entre les sons 9 et 10. En réunissant les neuf tons on trouvera donc une différence très sensible entre *sol*, *la*, harmoniques du son fondamental *sol* et le *sol*, *la*, harmoniques du son fondamental *fa*, la proportion étant 8, 9, d'une part et 9, 10, d'autre part.

Les musiciens qui soutiennent que cette différence n'est pas sensible dans la pratique de la musique n'ont qu'à se rendre compte, par expérience, de l'influence qu'elle a sur l'intonation des chanteurs. Que l'on fasse chanter : *do*, *re* en accompagnant ces deux notes au piano par les accords de *do* puis de *sol*, comme :



puis que l'on fasse soutenir le *ré* par le chanteur en l'accompagnant par l'accord de *si* ♭ majeur ce *ré* paraîtra absolument faux.

Donc, si avec accompagnement de piano un chanteur est obligé de modifier l'intonation d'une même note, selon l'accord qui l'accompagne, il est bien évident que toute théorie *basée sur le son fixe* est condamnée d'avance. Il faut donc commencer par des données très simples avant d'arriver à un système général assez développé pour que chacun des sons de l'échelle musicale puisse y prendre une place fixe et nettement définie.

Pour que l'enfant (ou n'importe quel commençant) ne donne pas une signification fausse aux différents sons, il est indispensable qu'au début de l'éducation musicale on emploie d'autres signes que des notes sur une portée. Le système

des chiffres est ce qu'il y a de meilleur et de plus simple. Toute théorie rationnelle ayant pour base les sept degrés de la gamme majeure, les chiffres 1, 2, 3, 4, 5, 6, 7 représentent très exactement à l'élève l'idée des sons qu'il doit émettre. Par tout ce qui précède, on doit comprendre aisément en quoi consiste la différence entre les principes que j'ai exposés et ceux admis généralement. Jusqu'ici on enseigne aux élèves le côté *extérieur* de la musique; on ne cherche qu'à leur mettre dans la mémoire une certaine quantité de sons et de combinaisons de sons *particuliers*, tandis que par le système que je préconise on ne s'occupe de la signification de ces sons et de ces combinaisons de sons que d'une manière *relative*, sans les désigner par un nom spécial.

Donc, on doit admettre qu'une éducation musicale basée *sur la notion des sons fixes* ne peut être qu'illogique de même *que la figuration de ces sons sur la portée*. Ceci une fois démontré, il ne reste plus qu'à formuler la Règle générale de toute instruction élémentaire rationnelle, soit:

1° Étude basée sur les sons résultant de la vibration d'un corps sonore (harmoniques), sons dont la valeur est modifiée selon le changement du son fondamental qui les engendre;

2° Étude des diverses *fonctions* de ces mêmes sons dans les combinaisons par lesquelles la musique est formée.

IV

Si on voulait analyser toutes les combinaisons musicales en prenant les sons fixes comme base, c'est-à-dire sans avoir recours à la transposition, on serait forcé d'en pousser l'étude à l'infini. Le système actuel de notation obligerait à se mettre dans la mémoire *toutes les possibilités de sons*, au moins jusqu'à trois dièses et trois bémols ajoutés à chaque tonalité. Et encore ne serait-on pas en état de démontrer logiquement qu'entre un *do* et un *ré* il y a, dans les différentes gammes, une différence notable que l'on ne peut indiquer sans se servir de chiffres montrant qu'on a affaire à : 1—2, 2—3, 4—5, 5—6, ou 6—7.

Une fois la transposition admise, la démonstration devient bien simple car il n'y a en musique que quatre relations entre les sons (trois intervalles, donc), savoir : la *seconde*, la *tierce* et la *quarte*.

Les modifications les plus usitées de ces intervalles sont :

1 — 2	2 — 3	3 — 4
do — ré	ré — mi	mi — fa
seconde majeure	seconde majeure	seconde mineure
(grande)	(petite)	(grande)
9 commas.	8 commas	5 commas.

1 — 3	2 — 4
do — mi	ré — fa
tierce majeure	tierce mineure
17 commas.	13 commas.

1 — 4
do — fa
quarte juste
22 commas.

Plus tard nous trouverons les autres modifications.

Tout autre rapport entre ces sons ne peut être considéré que comme une altération des intervalles désignés ci-dessus[1]. Il va sans dire que, placés dans l'ordre inverse (renversement), les mêmes différences subsistent. Ainsi:

1 — 2
do — ré

devient:

2 — 1
ré — do
septième mineure
(petite)
44 commas.

et ainsi de suite.

Arrivons, maintenant, à l'examen de ces différents intervalles. Mais pour obtenir un résultat satisfaisant il faut d'abord nous occuper de la constitution de la gamme et de sa signification.

Nous avons trouvé déjà trois groupes de trois sons chacun. Nommons ces sons:

2me groupe	1er groupe	3me groupe
sol — la — si	do — ré — mi	fa — sol — la
5 — 7 — 6	1 — 2 — 3	4 — 5 — 6

Nous avons vu que *sol-la* du 2me groupe diffère de *sol-la* du 3me groupe; la distance n'est pas la même, ce qui résulte de la différence du son fondamental dont ces notes sont les harmoniques.

Si donc on veut choisir entre ces deux *la* lequel on doit employer il faut, tout d'abord, examiner la modulation que fait la mélodie[2].

Le moment est venu de dire qu'il n'y a aucune mélodie,

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[1] La quarte augmentée, même, ne peut être considérée comme un intervalle primordial.

[2] Remarquons que l'on ne peut bien exécuter et analyser une gamme sans avoir quelques notions de la modulation.

si simple qu'elle soit, dans laquelle ne se trouve une modulation. Du reste le principe essentiel de la modulation existe même dans la gamme, car dans chaque gamme il y a trois notes fondamentales qui sont nommées: Tonique (I), Dominante (V) et Sous-Dominante (IV). Donc, dans la gamme (que l'on pourrait appeler «*la mélodie-type*»), on progresse de la *tonique* à la *sous-dominante*, puis, en continuant, on passe de la *dominante* à la *tonique*. Exemple:

1 2 3 4 — 5 6 7 1
\+ + + +

En réalité la seconde progression de cette mélodie n'est que la répétition de la première. En descendant on retrouve exactement, en sens inverse, le même groupement.

Une chose à laquelle on ne fait pas assez attention c'est que, dans la pratique de la musique, on n'emploie que rarement la gamme telle qu'elle est indiquée ci-dessus. Si on examine avec soin les mélodies des grands maîtres on voit qu'elles sont, pour la plupart, basées sur des fragments de gamme comme:

a) 5, 6, 7, 1 — 1, 2, 3, 4 — 4, 3, 2, 1 — 1, 7, 6, 5 — 5, 6, 7, 1.

Ceci s'explique facilement par le fait que si on conduit une mélodie vers la *sous-dominante*, il faut un arrêt ou bien une modulation pour pouvoir la continuer par la *dominante*. Qu'on se rappelle, en outre, que dans la formation de la gamme (voir plus haut page 12), les trois harmoniques de la *dominante* (sol) sont avant les harmoniques de la *tonique* (do) et que nous n'avons trouvé la *sous-dominante* que parce que nous avons considéré la *tonique* comme une nouvelle *dominante*.

Il est certain que, sans le rôle intermédiaire de la *tonique*, les deux *dominantes* n'ont aucun rapport entre elles. Et par cela il faut admettre qu'il n'y a, en musique, qu'une seule relation directe et positive, *celle de la tonique avec la dominante, celle de la tonique avec la sous-dominante étant la*

même en sens inverse. Ceci compris, le second groupement (a), page 18, est le seul logique et vrai, musicalement. Voyez encore :

5 6 7 1 — 1 2 3 4 — 4 3 2 1 — 1 6 7 5 — 5 6 7 1 [1]
V I V I IV I IV I V I

On remarquera comment, par la seule analyse de la gamme, la mélodie se trouve pourvue d'une harmonie simple et naturelle. Mais il y a plus. Tout le monde sait qu'à côté de *la mélodie* l'art musical renferme encore deux autres éléments : *le rythme* et *l'harmonie.*

De l'harmonie nous ne parlerons qu'après avoir bien étudié la question de la mélodie. Mais, par contre, il est indispensable, dès à présent, de fixer la base du rythme.

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[1] Considérée de cette façon, la gamme ou « mélodie-type » représente aussi la base du rythme.

V

Le principe général du rythme n'est autre que l'*Arcis* et le *Thésis;* en dehors de ces deux mouvements il n'y a rien, car ce qu'on nomme «mesure à trois temps» est simplement un rythme à deux temps dont un des deux mouvements est prolongé.

Le «temps fort» est le temps qui reçoit un accent; le «temps faible» est le temps non accentué.

Le temps fort coïncide avec la tonique de la mélodie. Dans une phrase mélodique *un son qui porte l'accent principal apparaît toujours comme tonique.*

On peut se rendre compte de ce fait en chantant des phrases ou des fragments de phrases, dans lesquelles on accentuera plus ou moins certains sons. Mais nous ne voulons pas dire par là que le sentiment d'une *tonique générale,* L'UNITÉ TONALE disparaisse, mais seulement, qu'à côté de la tonique générale on trouve continuellement *des toniques accidentelles.*

Avant de revenir à la constitution de la gamme en rapports avec le rythme, rappelons-nous que le célèbre professeur Hugo Riemann a fait remarquer, très justement, que toute phrase mélodique commence toujours par un temps faible[1].

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[1] Comme preuve Riemann fait observer que l'on ne peut commencer une respiration qu'en inhalant, que l'on ne peut commencer l'action de marcher qu'en levant un pied.

De quelque manière qu'on rythme la gamme on n'obtiendra un résultat satisfaisant qu'en employant la disposition : 5 6 7 1, 1 2 3 4, etc.

Ex. : a) 1 2 | 3 4 | 5 6 | 7 1 ||
1 2 3 | 4 5 6 | 7 1 0 ||
1 2 3 4 | 5 6 7 1 ||

En commençant par un temps faible le résultat est bien meilleur.

Ex. : b) 1 | 2 3 | 4 5 | 6 7 | 1 ||
1 2 | 3 4 5 | 6 7 1 || ou : 1 | 2 3 4 | 5 6 7 | 1 ||
1 2 3 | 4 5 6 7 | 1 ||

L'exemple a) montre que la *tonique* ne peut avoir sa véritable place rythmique quand on commence par le temps fort.

En commençant par le temps faible, comme dans l'exemple b), la *tonique* se trouve beaucoup mieux placée, sauf dans la première combinaison à trois temps.

Mais il faut remarquer que ces divers exemples ne commencent pas avec une véritable *tonique*. Dans l'exemple à trois temps c'est la *dominante* qui prend la place rythmique de la *tonique;* dans l'exemple à deux et à quatre temps c'est la *sous-dominante* qui se trouve sur le temps fort. En disposant la gamme du V grave au IV du médium la difficulté est écartée. Exemple :

5 6 7 | 1 1 2 3 | 4 4 3 2 | 1 1 7 6 | 5 5 6 7 | 1 ||

Dans cet exemple la tonique occupe partout la place qu'elle doit avoir au point de vue rythmique et, en outre, la question du sixième degré qui pouvait présenter de grandes difficultés dans les versions précédentes se trouve résolue parce que la *dominante* et la *sous-dominante* (les deux antagonistes!) sont séparées par la *tonique*.

De plus, la gamme ainsi disposée nous donne une base

générale pour la forme de la mélodie-type, forme qui ne peut être que ce qu'on appelle ordinairement «la Cadence».

La cadence est l'enchaînement successif des trois degrés de la gamme qui sont les fondamentales de chacune des trois petites séries de sons dont la gamme est composée, savoir: I, V, IV. Comme IV et V n'ont point de rapport entre eux il est indispensable que ces degrés soient séparés par I.

Donc, la forme de cadence (qui est en même temps la forme de la mélodie-type) est:

I, IV, I, V, I ou bien: I, V, I, IV, I.

Comme, d'après le principe si juste de Riemann, il faut que la *tonique* soit placée sur un temps fort, il est donc indispensable de commencer la cadence par un temps faible, soit par la *dominante*:

V | I IV | I V | I ‖

5 6 7 | 1 1 2 3 | 4 4 3 2 | 1 1 7 6 | 5 5 6 7 | 1 |
V I IV I V I

Par tout ce qui a été dit jusqu'ici il est suffisamment prouvé:

1° Que la formation de la gamme renferme toute la théorie musicale;

2° Que le *matériel* dont on se sert ne peut être composé que des harmoniques 8, 9, 10 et 6;

3° Que la jonction du 6^{me} harmonique aux 8^{me}, 9^{me} et 10^{me} exige déjà l'intervention du sentiment artistique.

Au lieu d'adopter l'intervalle de quarte juste on aurait peut-être pu se servir d'un autre. Mais il est évident qu'en ce cas toute la théorie musicale actuelle serait bouleversée.

Les œuvres de tous les grands maîtres prouvant que (inconsciemment peut-être) ils se sont appuyés sur les bases que nous exposons, nous ne pourrions abandonner le prin-

cipe de la quarte juste, *comme lien naturel*, sans renoncer à suivre les exemples qu'ils nous ont laissés.

Admettant, donc, que la quarte juste est le seul intervalle propre à continuer la série des sons, nous pouvons ajouter aux trois propositions précédentes :

4° Que dans la gamme les 1^er^, 4^me^ et 5^me^ degrés ont une signification spéciale qui est tout à fait différente de celle des autres degrés ;

5° Qu'en mettant ces trois degrés dans le rapport rythmique le plus naturel, la *tonique* devra toujours coïncider avec le temps fort tandis que la *dominante* et la *sous-dominante* seront toujours placées sur les temps faibles;

6° Que chaque fois que l'une des deux *dominantes* est placée sur un temps fort la mélodie fait une modulation; de sorte que la *tonique* initiale fait, pendant quelque temps, fonction de l'une ou de l'autre *dominante*.

Dans la gamme, telle que nous l'avons vue en dernier lieu, la mélodie commence par une modulation à la *sous-dominante;* elle revient ensuite à la *tonique*, puis elle module à la *dominante* pour retourner à la tonique tandis que les trois premiers degrés forment l'« Arcis » de Riemann.

La raison pour laquelle ces deux modulations sont nécessaires est toute naturelle. Tant qu'un son n'a pas été mis en relation avec ses deux *dominantes* on ne peut l'entendre comme *tonique*. Les deux modulations ci-dessus sont donc indispensables, dans n'importe quelle œuvre musicale, soit étendue soit restreinte, pour fixer sa tonalité et déterminer sa forme.

VI

Il nous faut, maintenant, étudier la fonction des autres degrés de la gamme.

Tant que ces degrés ne sont pas considérés au point de vue de l'harmonie, ils ne peuvent être compris que comme des *notes de passage*. Mais aussitôt que leur sens mélodique est mis en rapport avec l'harmonie, l'aspect de la gamme change complètement.

Au point de vue purement mélodique, les trois premiers degrés d'une gamme sont issus du son fondamental I (la *tonique*); les quatrième, cinquième et sixième degrés proviennent du son fondamental IV (la *sous-dominante*); enfin les cinquième, sixième et septième degrés résultent du son fondamental V (la *dominante*). Remarquons tout d'abord que les cinquième et sixième degrés se trouvent dans la série de la *sous-dominante* et dans la série de la *dominante*.

Rappelons-nous, en outre, que le cinquième degré a été pris parmi les harmoniques du son fondamental et nous verrons : 1° que le cinquième degré peut faire fonction de *son fondamental* de la *dominante*, de *quinte* de la *tonique* ou de *seconde majeure* de la *sous-dominante;* 2° que le sixième degré peut avoir la fonction de *seconde majeure* de la *dominante* ou de *tierce majeure* de la *sous-dominante* Mais il y a plus :

De même que le cinquième degré peut être considéré comme son fondamental de la *dominante*, la *tonique* peut être aussi considérée comme tel pourvu qu'elle se trouve sur un temps faible. Dans ce cas le deuxième degré prendra

la signification d'un sixième degré et le quatrième degré deviendra, par cette interprétation, une *nouvelle tonique*. Il sera, alors, nécessaire de créer une *nouvelle sous-dominante* à côté de cette *seconde tonique* et de cette *seconde dominante* sur un autre diapason.

Il est certain que le rythme suffit pour préciser ces changements de fonction. Néanmoins l'harmonie offre, en pareil cas, de très grandes ressources.

Mais qu'est-ce, en somme, que l'harmonie?

On pourrait répondre que, rigoureusement parlant, l'harmonie se résume en un seul accord formé des trois harmoniques 4, 5, 6. On appelle cet accord : *accord parfait*. Tous les autres ne sont que des modifications, altérations, etc., de cet *accord-type*.

En disposant les notes de la gamme par tierces on trouve, comme on le sait, trois accords parfaits: 1° sur la *tonique*, 2° sur la *sous-dominante*, 3° sur la *dominante*. Ces accords sont formés avec les degrés de la gamme: 4, 6, 1. — 1, 3, 5. — 5, 7, 2.

On voit que, par suite de cette disposition, les degrés 1 et 5 peuvent avoir une double fonction: *fondamentale* et *quinte*. En outre la fonction de la *quinte* a été amplifiée car, jusqu'ici, le cinquième degré de la gamme n'avait sa place dans la série des sons que pour compléter le groupe formant le « Tétracorde ».

En réalité chaque quarte provoque une modulation dans la mélodie. Aussitôt que l'on se sert du renversement de la quarte, c'est-à-dire la quinte, et que cette quinte fait partie d'un accord elle appartient, alors, à la série des harmoniques qui résultent d'un seul son fondamental.

Tout ceci démontre que lorsqu'on admet l'harmonie comme une des bases de l'art musical, les notes de la gamme peuvent avoir une signification autre que celle qu'elles ont quand on les considère simplement comme notes mélodiques.

Remarquons bien qu'une théorie qui prendrait comme base les huit sons de la gamme ne saurait être rationnelle puisque les degrés 5, 6, 7, 1 ne sont que la répétition exacte, à un autre diapason, des quatre premiers: degrés 1, 2, 3, 4.

Voici, d'abord, la gamme considérée purement et simplement comme mélodie: (Les chiffres romains indiquent les sons fondamentaux).

a) 1 2 3 4 5 6 5 6 7 1
I IV V I

Voici, maintenant, la gamme dont chaque note est considérée comme faisant partie d'un accord parfait:

b) 1 2 3 4 5 6 5 6 7 1
I V I IV I IV I IV V I

L'exemple a) démontre que les degrés 2, 5, 6 n'ont point de signification harmonique dans les trois séries dont se compose la gamme.

Dans l'exemple b), au contraire, chaque note mélodique a sa fonction spéciale par l'harmonie:

1 fait partie de l'accord de *tonique* (fondamentale),
2 » » » » » *dominante* (quinte),
3 » » » » » *tonique* (tierce),
4 » » » » » *sous-dominante* (fondamentale),
etc.....

En comparant les deux exemples (a et b) on peut voir aisément que la seconde manière d'interpréter le sens de la gamme n'est que l'extension de la première car les accords I, V, I et IV, I, IV ne changent pas le sens mélodique au point qu'on ne puisse plus considérer la gamme comme *unité mélodique.*

Voyez l'exemple suivant:



Le deuxième degré (mélodique) a bien le sens de *dominante* et le cinquième degré (au second temps de la deuxième mesure) a bien le sens de *tonique*.

A la troisième et à la quatrième mesure nous nous trouvons en présence d'un cas différent. Si on voulait appliquer à ces deux mesures le même principe qu'aux deux premières, on ne pourrait considérer le *sol* (cinquième degré de la gamme) que comme *une nouvelle tonique* à un diapason plus élevé.

En admettant cette conception les quatre derniers sons ne seraient plus le complément des quatre premiers et ce « tétracorde » devrait être considéré comme un commencement, non comme une conclusion. Or, cela ne se peut pas. Tels qu'ils sont écrits ces quatre sons ne représentent qu'un accord de *dominante* modifié qui se résout sur la tonique. Pour donner une explication rationnelle de ce « tétracorde », il faut avoir recours, de nouveau, à la théorie de la mélodie.

La mélodie-type (la gamme) nous a montré que dans toute mélodie il y a, à côté des notes essentielles, des notes accessoires. Nous avons trouvé comme telles : le deuxième degré dans la première série; le cinquième degré dans la seconde série et, enfin, le sixième degré dans la troisième série. A la troisième mesure de notre exemple se trouvent donc des notes accessoires, ou *de passage* dans trois des quatre parties dont se compose l'harmonie. En réalité il n'y a que la basse qui fasse entendre *une note réelle, la dominante*. En considérant que toute harmonie a sa base dans le contrepoint (qui n'est autre chose qu'une superposition de mélodies), on serait tenté de présenter la gamme avec une harmonie, telle que celle que l'on trouvera ci-après, dans laquelle il n'y aurait que la basse donnant les notes réelles.



A côté du sens mélodique et harmonique de cet exemple nous avons à examiner son sens rythmique.

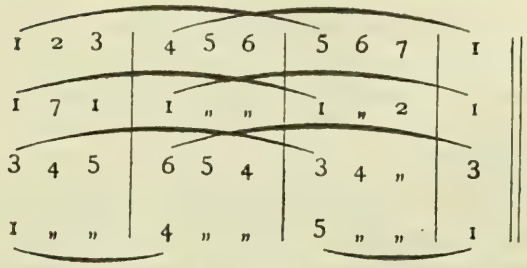
Il va sans dire que pour bien phraser une mélodie, il est indispensable de chercher, avant tout, quelle est la signification de chacun des sons dont elle est formée. Ainsi, par exemple, jamais une note accessoire ne peut terminer une phrase.

En examinant notre exemple on verra tout de suite que la mélodie (basée sur I, IV, V, I) se divise en deux phrases absolument égales, car de I à IV on trouve le même rapport que de V à I. Donc, en principe, il y a fin de phrase après le quatrième degré tout comme, ensuite, après le premier degré. Ce sont donc le quatrième degré (deuxième mesure) et le premier degré (quatrième mesure) qui sont accentués. Mais les notes de passage relient si étroitement la troisième mesure à celle qui précède, qu'il est impossible de séparer les deux phrases, ce qui fait que la gamme, traitée comme elle l'est dans le dernier exemple, constitue une unité indivisible grâce à la mélodie.

Il ne sera pas inutile de démontrer plus amplement de quelle manière on doit analyser cette gamme.

Do (note réelle), passe par *ré* et *mi* (notes de passage) pour arriver à *Fa* (note réelle). Si il y avait un arrêt sur *Fa* on pourrait prendre *Sol* (note réelle) et, en passant par *la* et *si* (notes de passage) arriver à *Do* (note réelle) absolument comme on est arrivé à *Fa* dans le premier « tétracorde ». Mais le *Fa* (note réelle) est suivi d'une note de passage, de sorte qu'on ne peut savoir si, dans la troisième mesure, c'est le *sol* ou *la* qui est note réelle. Ce n'est qu'en arrivant au *Si* qu'on peut avoir la certitude qu'il s'agit de l'accord de *dominante*. C'est alors, seulement, que l'on comprend que le premier et le second temps de la troisième mesure reposent sur la *dominante modifiée* momentanément par des notes de passage ou accessoires comme le *fa* dans l'accord *sol, si, ré*.

La phrase mélodique (dans les différentes parties) doit donc être divisée ainsi :



Après cette analyse il n'est pas difficile de préciser le sens de chaque note de la gamme.

1. Son fondamental de la *tonique* ou *quinte* de la forme *sous-dominante*.

2. *Quinte* de la *dominante*.

3. *Tierce* de la *tonique*.

4. Son fondamental de la *sous-dominante*.

5. Son fondamental de la *dominante* ou quinte de la *tonique*.

6. *Tierce* de la *sous-dominante*

7. *Tierce* de la *dominante*.

Cet examen prouve qu'en dehors des trois sons fondamentaux (I, IV, V), trois autres degrés de la gamme ne peuvent avoir *qu'une seule fonction*, savoir :

2^me^ degré, *quinte* de la *dominante ;*
3^me^ degré, *tierce* de la *tonique ;*
7^me^ degré, *tierce* de la *dominante*.

Tant qu'on ne connaît que les trois accords parfaits majeurs (accords fondamentaux), le 6^me^ degré ne peut avoir d'autre fonction que celle de *tierce* de la *sous-dominante*.

Mais il ne faut pas oublier que dès notre première analyse de la formation de la gamme nous avons trouvé *deux* 6^mes^ *degrés*, l'un appartenant à la série de la *dominante* (seconde majeure), l'autre appartenant à la série de la *sous-dominante* (tierce majeure).

C'est là une difficulté qui ne peut être résolue qu'en abandonnant la gamme considérée comme base générale de la théorie musicale et en la remplaçant par le système du « tétracorde ».

Si, provisoirement, nous acceptons ce système, nous

avons à faire un choix entre le premier tétracorde et le second, choix qui ne semble pas douteux car le second nous offre une forme mélodique complète, soit :

5	6 7	1	‖
I	IV V	I	‖

Mais il ne faudrait pas perdre de vue que, dans cet exemple, le rythme laisse à désirer.

Le premier accord se trouvant sur un temps faible ne peut être compris que comme *dominante* et non comme *tonique*. En réalité cet exemple aura le sens suivant :

2	3 (6) 7	1	‖
V	I (IV) V	I	‖

qui, traduit en notes, donnera :



Voyons, maintenant, le premier « tétracorde » soit :

1 2	3 4	‖
I V	I IV	‖

dans lequel on ne trouve pas, comme dans le second, une forme mélodique complète car il paraît n'être que le commencement d'une phrase. Mais au lieu de considérer cela comme un défaut nous devons, au contraire, reconnaître que c'est un avantage. Si *le matériel naturel* que nous avons à employer pour arriver à un but artistique était, par lui-même, l'Art, le travail de l'artiste serait bien peu de chose. C'est donc la manière d'utiliser le matériel naturel qui constitue l'Art véritable.

Il suffit d'ajouter la *tierce* de la *tonique* au « tétracorde » ci-dessus pour avoir une base parfaite, permettant la formation de toutes les mélodies imaginables.

Mais il y a plus, encore : Dans ce premier « tétracorde » la position de la *dominante* et de la *sous-dominante* est bien préférable à celle du second « tétracorde », et voici pourquoi : La progression de la *tonique* à la *dominante* représente une

augmentation de force et de vie: C'est l'enfant qui se développe pour devenir un homme. Au contraire la progression de la *tonique* à la *sous-dominante* ne représente qu'un affaiblissement: c'est l'homme qui devient un vieillard.

Si, par la pensée, on élargit le premier « tétracorde », on trouvera qu'il est, non seulement l'élément primordial de toute forme musicale aussi ample que possible, mais encore l'élément de tout *criterium* pour juger de la beauté esthétique de n'importe quelle œuvre. En effet, toute œuvre qui, dans ses grandes lignes, n'est pas basée sur les lois du premier « tétracorde » n'est qu'une improvisation sans forme définie.

C'est donc au premier « tétracorde » que nous aurons recours pour constituer *le matériel* nécessaire à nos études ultérieures.

VII

Quand nous avons exposé les trois accords parfaits (qui, à l'égard de l'harmonie, régissent toute la musique de même que la gamme, à l'égard de la mélodie, de même, encore, que tout rythme se trouve dans l'*arsis* et le *thésis*), la série des *tierces* a été formulée de la manière suivante:

$$\dot{4}\ \dot{6}\ 1 - 1\ 3\ 5 - 5\ 7\ 2$$

En commençant par l'accord de *tonique* nous nous trouvons en présence d'un fait harmonique nouveau, soit: un accord de trois sons dont la *tierce* n'est pas une *tierce majeure* mais bien une *tierce mineure.* Voici l'exemple:

$$1\ 3\ 5 - 5\ 7\ \dot{2} - \dot{2}\ \dot{4}\ \dot{6}$$

Si l'on prenait simplement les fondamentales dès trois accords on pourrait croire que la mélodie a fait une modulation vers la *dominante.* Mais le quatrième degré nous empêche d'attribuer le sens de *dominante* à ce nouvel accord qui ne peut avoir que le sens de *sous-dominante* dans cette combinaison.

La constitution de l'accord est la même que celle de l'accord parfait, sauf que la *tierce* est baissée et, par ainsi, devient mineure. Selon l'habitude nous le nommerons: *accord parfait mineur.*

Cet accord donne aux deuxième et sixième degrés de la gamme une nouvelle fonction, c'est-à-dire que :

1° Le *deuxième* degré peut être la *fondamentale* d'un accord parfait mineur;

2° Le *sixième* degré peut être la *quinte* de ce même accord.

Puisque le quatrième degré (*tierce* de l'accord) appartient à la série de la *sous-dominante*, cet accord ne peut être considéré que comme *auxiliaire* ou relatif de l'accord de *sous-dominante*.

En examinant le *sixième* degré, *quinte* de cet accord, nous verrons que ce degré doit être pris dans la série des harmoniques provenant de la dominante comme son fondamental. Voici pourquoi :

Du premier au cinquième degré (1 à 5, type de la *quinte juste*), on trouve :

1 — 2,	seconde	*majeure*	(grande)	9 commas
2 — 3	»	»	(petite)	8 »
3 — 4	»	*mineure*		5 »
4 — 5	»	*majeure*	(grande)	9 »

TOTAL : 31 commas.

Ainsi : deux *grandes* secondes majeures, une *petite* seconde majeure et une *seconde mineure*.

La *quinte juste* entre les *deuxième* et *sixième* degrés (2 à 6), doit donc aussi renfermer :

2 — 3,	seconde	*majeure*	(petite)	8 commas
3 — 4	»	*mineure*		5 »
4 — 5	»	*majeure*	(grande)	9 »
5 — 6	»	»	(»)	9 »

TOTAL : 31 commas.

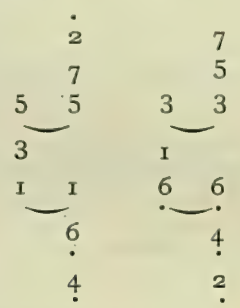
sans quoi il manquerait un comma (neuvième partie de la *seconde majeure*[1]) à la justesse de la *quinte*.

[1] Exprimé par nombre de vibrations on trouverait comme différence :

$\frac{5}{1} = 31$ $\frac{6}{2} = 31$ le 6 étant pris dans les harmoniques de la dominante $\frac{6}{2} = 30$ le 6 étant pris dans les harmoniques de la la sous-dominante

Ceci est très important car, pour la première fois, nous trouvons un accord appartenant à la série de la *sous-dominante* qui montre, par le rapport de sa fondamentale avec sa quinte, une parenté très étroite avec la série de la *dominante*. En outre, puisque cet accord est considéré, avec raison, comme *auxiliaire* de l'accord de *sous-dominante*, il s'en suit que les deux autres accords peuvent, aussi, avoir leur *auxiliaire*.

En continuant par *tierces* successives, nous trouverons tout naturellement: 2 4 6 — 6 1 3 — 3 5 7 puis, faisant la comparaison, nous verrons qu'il y a dans la gamme deux séries d'accords, l'une sur IV, I, V, l'autre sur II, VI, III.



Donc, chaque accord *principal* a, à son côté, un accord *auxiliaire*.

Il faut remarquer que dans les trois accords auxiliaires la relation entre la fondamentale et la quinte exige une petite modification de la note qui constitue cette quinte. Voyons pourquoi.

Dans l'accord du deuxième degré nous avons dû nous servir du 6 *haut* pour avoir la *quinte juste* de trente et une vibrations. Pour la même raison il a fallu, dans l'accord composé de 6, 1, 3, substituer au 3 de la gamme un 3 ayant un comma de plus. Enfin il est nécessaire de modifier aussi le 7 pour obtenir une *quinte juste* dans l'accord 3, 5, 7. On peut se demander pourquoi on ne se servirait pas du 6 de la *sous-dominante* dans l'accord 2, 4, 6, car, alors, on n'aurait de changement que dans un seul accord, celui du deuxième degré, au lieu des trois changements du 6, 3 et 7 dans trois accords. Mais il ne faut pas oublier que, dans ce cas, on

toucherait à la *quinte* de l'accord principal 5, 7, 2, et qu'alors cette *quinte* devrait être baissée pour être une *quinte* juste et que, de plus, le 1 et le 4 devraient être changés de même. Cependant le résultat final ne serait pas différent car il s'agit simplement d'obtenir des *quintes justes* à côté des *tierces majeures.*

Après tout ce qui vient d'être exposé on doit comprendre que la gamme, telle que celle dont nous nous servons, est une chose très compliquée déjà. On ne peut donc pas considérer cette gamme comme base des matériaux nécessaires à l'édification d'une théorie musicale. En faisant cela on se trouverait continuellement en présence de problèmes techniques qu'on ne pourrait pas résoudre d'une façon logique. Par contre la petite série de trois sons harmoniques 8, 9, 10, auxquels on adjoint la quarte juste (relation de 6 et 8 des harmoniques) pourra toujours nous fournir un *matériel* répondant à toutes les exigences[1]. La quarte juste (bien qu'elle fasse partie des matériaux naturels) doit être considérée comme la première combinaison dans laquelle *l'art* doit intervenir, car pour arriver à unir cette quarte aux trois autres sons une modulation (soit un changement du son fondamental) est indispensable.

En résumant tout ce qui a été dit jusqu'ici on arrive aux conclusions suivantes :

1° Pour fonder une théorie musicale logique il faut commencer par étudier la mélodie;

2° La mélodie (gamme-type) est une succession de sons qui est formée par trois séries de trois sons chacune (les sons harmoniques 8, 9, 10) résultant d'au moins trois sons fondamentaux qui se trouvent, entre eux, en rapports de *quartes justes;*

1 Remarquons qu'à cet égard la théorie de Riemann est insuffisante. Il prend comme base l'accord parfait *do, mi, sol* auquel il ajoute les notes intermédiaires *ré* et *fa* comme notes secondaires. Quelle raison y aurait-il alors pour donner aux notes *fa* (*sous-dominante*) et *sol* (*dominante*) l'importance qu'on leur accorde?

Et puis, avec ce système, quel résultat pourrait-on obtenir sans l'emploi de la transposition dès le début?

3° La gamme (ou mélodie-type) est divisée en deux parties égales (tétracordes);

4° Les sons opposés (le grave et l'aigu) de chaque tétracorde représentent toujours soit la *tonique* soit une des deux *dominantes;*

5° Chaque tétracorde implique une modulation. Dans le premier la modulation s'effectue de la *tonique* à la *sous-dominante;* dans le second, qui commence par la *dominante,* c'est de la *dominante* à la *tonique* que se fait la modulation;

6° On ne connaît comme base générale du rythme qu'un « *arsis* » et un « *thésis* ». Chaque son, chaque mesure et même chaque phrase recevant l'accent *(thésis)* devient, pour l'auditeur, la tonique rythmique, quelle que soit celle des trois fonctions tonales (I, IV, V) sur laquelle l'accent se trouve;

7° L'harmonie qui, en soi, n'est que le complément de la mélodie et du rythme, ne sert qu'à *souligner* ces deux éléments primordiaux de la musique. Elle ne se compose que de deux accords: *l'accord parfait majeur* sur les degrés I, IV, V et *l'accord parfait mineur* sur les degrés II, III, VI;

Les trois accords parfaits majeurs sont les seuls accords naturels, les accords parfaits mineurs n'étant que les auxiliaires, les suppléants des autres;

8° Aussitôt que l'on commence à employer l'harmonie les conditions de la mélodie-type sont nécessairement modifiées puisque, dans sa constitution purement mélodique, la gamme ne contient qu'un seul degré changeant (le 6^{me}), tandis qu'il y en a trois (le 3^{me}, le 6^{me} et le 7^{me}), qui doivent être changés par le fait de leur emploi dans les accords majeurs et mineurs;

9° Outre les intervalles mentionnés jusqu'ici dans tous les ouvrages théoriques (solfèges, etc.), il faut admettre, même dans la gamme simple (mélodie-type), un autre intervalle que nous nommerons désormais : INTERVALLE ENHARMONIQUE. La gamme aura, en conséquence, la contexture suivante: 1 2 3 ^{3} 4 5 $\overset{6}{\cdot}$ 7 ^{7} 1. Ce n'est que dans la gamme ainsi constituée que l'on peut trouver les éléments indispensables pour établir les bases d'une théorie rationnelle de la musique.

Il serait inutile d'insister sur la nécessité de se servir de chiffres au commencement des études musicales. On doit comprendre que les signes de notation sur une portée sont tout à fait insuffisants pour donner une idée exacte de ce que l'on a à démontrer.

Pour ceux de nos lecteurs qui ne seraient pas convaincus nous allons faire un simple calcul qui, nous l'espérons, les amènera à penser comme nous.

Une gamme embrasse 11 sons. On se sert de 15 diapasons que l'on nomme généralement TONALITÉS. Il faut donc 15 fois 11 sons pour établir notre système musical, soit 165 sons différents. Il ne faut pas oublier que ce total ne représente que les relations des sons entre eux par rapport à *une seule* tonalité comme centre du système. Or, comme une œuvre écrite en *do* ♯ majeur ou en *do* ♭ majeur ne peut avoir *do* ♮ comme centre, on est donc forcé d'admettre 15 centres différents !

Quel résultat logique peut-on attendre d'une théorie qui reconnaîtrait 15 fois 165, soit 2475 *rapports de sons différents?*

La vérité est que, seul, le principe de la transposition est une base solide. Avec ce principe tout devient simple et rationnel; sans lui toute théorie paraît impossible.

VIII

Toujours en nous appuyant sur la mélodie-type, nous avons maintenant à étudier ce qu'on appelle le *mode mineur*.

Dans la gamme majeure (celle qui a été vue ci-dessus) nous avons trouvé trois accords parfaits mineurs et, comme conséquence naturelle de ces accords, nous avons constaté l'obligation de modifier la fonction des 3me, 6me et 7me degrés de la gamme mélodique. Ceci posé, il n'y a plus qu'à admettre que les sons fondamentaux de ces trois accords, appartenant à la gamme majeure, peuvent être considérés comme *sons fondamentaux dans une autre gamme* et le mode mineur sera formé.

Il est évident que le 6me degré étant pris comme *tonique* nouvelle, le 2me degré deviendra *sous-dominante* et le 3me degré deviendra *dominante* et que, par conséquent, le 4me degré sera *tonique relative* ou auxiliaire, le 7me degré sera *sous-dominante relative* ou auxiliaire et le 1er degré sera *dominante relative* ou auxiliaire. Il n'y aura de changé dans les rapports que les *tierces*, *sixtes* et *septièmes* qui seront modifiées si on les compare avec la mélodie-type ou gamme majeure. C'est ici qu'il y a lieu de mentionner un intervalle dont, jusqu'à présent, nous n'avons pas parlé. Cet intervalle est la *quarte augmentée* et son renversement la *quinte diminuée*.

Ni dans la mélodie ni dans les accords nous n'avons encore rencontré cet intervalle sauf comme note auxiliaire

ou de passage[1]. Mais, maintenant, nous trouverons cet intervalle *comme note réelle* dans l'accord relatif $\frac{4}{2}$. La signification n'en est pas douteuse car, de même que nous avons trouvé dans les accords fondamentaux du mode mineur la modification de la *tierce majeure*, nous trouvons ici la modification de la *quinte juste*.

La fonction de l'accord n'est pas changée par cette modification qui, bien au contraire, en renforce le sens. L'intervalle 7—4 dans le mode majeur ne peut, d'ailleurs, être étudié maintenant parce qu'il résulte d'une note auxiliaire. C'est en parlant des accords de septième que nous en donnerons l'explication.

Il est très important de remarquer que dans la mélodie-type (gamme majeure) nous n'avons trouvé de relation entre deux accords (comme auxiliaires ou suppléants) que du 1 au 6, du 4 au 2 et du 5 au 3. Dans la gamme mineure c'est tout le contraire :

Le 6 n'est pas en relation avec le 1 mais avec le 4.
Le 2 » » » 4 » » 7.
Le 3 » » » 5 » » 1.

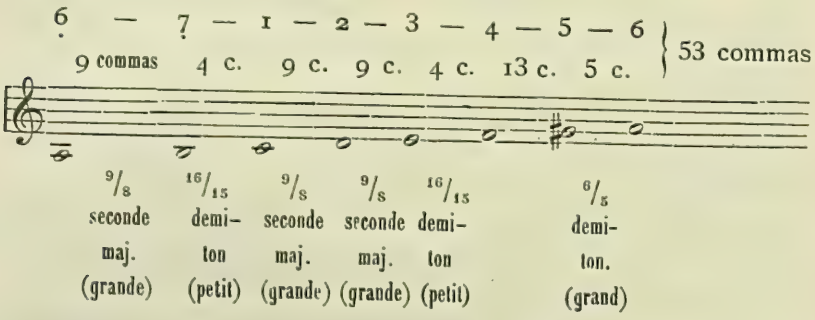
La musique étant *l'art d'employer toutes les combinaisons possibles de sons*, il est évident qu'en mélangeant habilement les deux modes (majeur et mineur) on peut se servir de 1—6 ou de 1—3 comme *tonique* et son auxiliaire.

Pour faire admettre le 7^{me} degré du mode mineur comme *sensible*, il faut qu'il soit placé à distance de *demi-ton* au-dessous de la nouvelle *tonique*. En faisant cela nous ne faisons que suivre l'exemple des anciens qui avaient remarqué que ce demi-ton est indispensable pour donner à un son quelconque le sens de tonique. Il nous reste à établir les rapports que les degrés de la gamme ont entre eux.

Le mode mineur résulte des trois accords parfaits mineurs du mode majeur. Or, dans ces trois accords les 3^{me}, 6^{me} et 7^{me} degrés de la gamme majeure ont la fonction

[1] Remarquons que jamais une note de ce genre ne peut compter comme base dans la théorie.

de *quinte juste*. Il s'en suit que, dans la gamme mineure les demi-tons du 2 au 3 et du 5 au 6 ne doivent être composés que de quatre commas, non de cinq, comme dans la gamme majeure. On trouve donc les rapports suivants :



Il nous semble inutile d'insister plus longuement sur la constitution de la gamme mineure qui n'est, en réalité, qu'une gamme majeure avec certaines modifications[1].

[1] La théorie de Riemann, à cet égard, ne peut être appliquée qu'à la condition de renoncer à considérer l'harmonie comme une des bases de la musique. En traitant de la modulation, nous reviendrons sur ce sujet.

IX

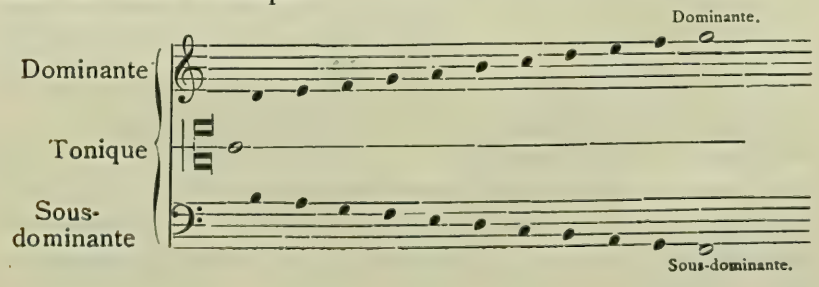
Au point où nous sommes arrivés, maintenant, il faut nous occuper de la *gamme chromatique.*

Mais avant de commencer l'étude de cette gamme il est nécessaire d'aborder la grande question du *son fixe* et de la *transposition.*

Pour tout ce qui a été démontré jusqu'alors on pouvait, à la rigueur, se passer du son fixe : maintenant ce serait impossible. Il va sans dire qu'on ne peut pas d'emblée placer l'élève en face d'une question aussi complexe. Il faut, au contraire, s'en occuper dès le début des études.

Aussitôt qu'un élève est en état de chanter la gamme majeure en partant de différents diapasons, il est bon de lui expliquer la signification de la *portée* et des signes qui sont placés dessus, savoir : les *clés* de *fa*, d'*ut* et de *sol*, les *notes*, les *dièses*, les *bémols*, les *bécarres*, etc.

Il est de toute nécessité que le commençant (même s'il est encore un enfant) apprenne toutes les clés en même temps, sans quoi il ne pourrait comprendre le but et l'utilité de la portée qui ne se compose pas de *cinq* lignes mais bien de *onze*. Exemple :



La portée disposée de cette manière montre parfaitement que les onze lignes et les trois clés indiquent les trois fonctions tonales seules valables en musique.

Avant d'aller plus loin il faut signaler une difficulté que l'on trouve dans les pays où l'on a adopté, pour désigner les notes, les syllabes *ut* (ou *do, ré, mi, fa, sol, la, si,* au lieu de c, d, e, f, g, a, b).

Chacun sait que les syllabes *ut, ré, mi, fa, sol, la* furent employées pour désigner les six degrés de l'« hexacorde ». C'est seulement en les utilisant de cette façon qu'elles ont une valeur réelle. Chez les peuples qui font usage des lettres *c, d, e,* etc., l'emploi des dénominations *do, ré, mi,* etc., ne crée pas de difficultés pour la transposition. Mais en France, en Italie, etc., cela peut troubler l'esprit des élèves parce qu'il faut se servir, en transposant, du nom des sons fixes.

Le mieux serait donc d'adopter l'usage des nombres un, deux, trois, quatre, cinq, six et sept, *pour transposer* et des syllabes *do, ré, mi, fa, sol, la, si, pour les sons* fixes.

Aussitôt que les élèves connaîtront le nom et la place que les notes occupent sur la portée, ils commenceront l'étude des gammes majeures qu'ils devront apprendre par cœur. Ils devront, ensuite, s'exercer à chanter ces gammes en cherchant à se rendre bien compte de la différence de diapason ou *point de départ* de chaque gamme. Il va sans dire qu'ils chanteront en énonçant les degrés comme, par exemple :

un, deux, trois, quatre, cinq, six, sept, un

et non pas les noms : do, ré, mi, fa, sol, la, si, do.

sol, la, si, do, ré, mi, fa ♯, sol.

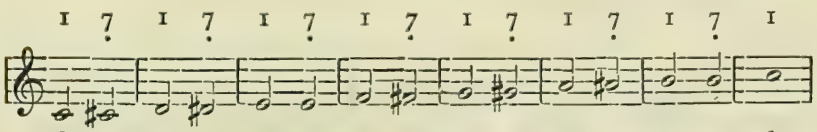
ré, mi, fa ♯, sol, la, si, do ♯, ré, etc.

Si on le fait s'exercer ainsi, l'élève comprendra, dès le début de ses études, que toutes les gammes *sont absolument semblables* malgré les diverses dénominations dont on se sert pour indiquer la différence de diapason.

Peu à peu on adjoindra à cette étude celle des deux accords parfaits et de la gamme mineure avec ses accords.

Alors, s'il a travaillé sérieusement, l'élève sera à même de comprendre facilement ce qui va être dit sur la gamme chromatique.

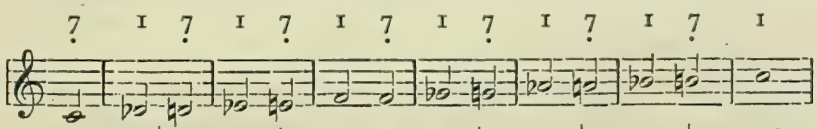
La succession de sons appelée « gamme chromatique » est une série de changements de tonalité. Ce sont les septième et premier degrés de différentes gammes qui s'enchaînent ainsi :



en *do*, en *ré*, en *mi*, en *fa*, en *sol*, en *la*, en *si*, en *do*

I V I V I V I V I V I V I V I

Voici la même suite de sons écrite avec les bémols :



en *ré* ♭, en *mi* ♭, en *fa*, en *sol* ♭, en *la* ♭, en *si* ♭, en *do*

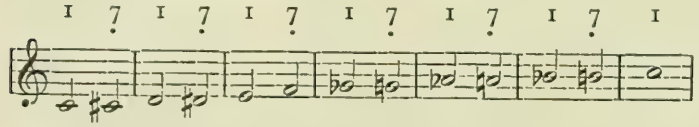
V I V I V I V I V I V I V I

En comparant ces deux exemples on voit que la première gamme chromatique commence par la *tonique* du ton de *do* tandis que la seconde commence par la *dominante* du ton de *ré* ♭. Dans les deux gammes il y a un point d'arrêt ou note répétée, *mi*, dans la première, *fa*, dans la seconde. La répétition du *mi* est nécessaire pour éviter l'emploi de *doubles dièses;* celle du *fa*, pour éviter l'emploi de *doubles bémols*. Sans cette précaution on serait forcé d'employer un *double dièse* après le premier « tétracorde » et un *triple dièse* après le second[1]. Le cas serait le même, dans le second exemple, en ce qui concerne les bémols.

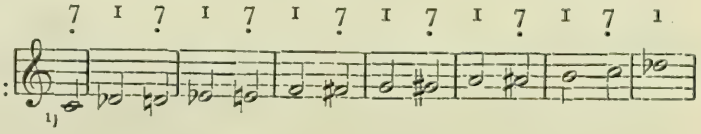
Ceci prouve, une fois de plus, que ce n'est pas sur une gamme de huit tons que l'on peut baser la théorie mais bien sur le « tétracorde ».

[1] De plus on ne reviendrait jamais au *do*.

Si l'on veut écrire une gamme chromatique sans qu'il y ait un arrêt à la fin du premier « tétracorde », il faut employer les *dièses* dans la première moitié et les bémols dans la seconde. Exemple :



ou bien, au contraire :



Il est à remarquer que les *bémols*, avec le demi-ton au-dessous, représentent plutôt *fa—mi* que *do—si*, tandis que les *dièses*, avec le demi-ton au-dessus, représentent *si—do*. Mais comme nous nous basons non sur la gamme mais sur le « tétracorde », la question n'a pas d'importance, *si—do* étant la transposition de *mi—fa* une quinte plus haut.

[1] Le *do* n'étant pas une tonique cet exemple n'est pas en *do*.

X

Nous avons, maintenant, à étudier la *gamme enharmonique.*

Il n'est pas inutile de rappeler qu'il a été parlé de l'intervalle enharmonique dès le début de nos études. La différence entre le sixième degré de la gamme considéré comme *tierce de la sous-dominante* et ce même degré considéré comme *seconde de la dominante* n'est autre chose que l'intervalle enharmonique.

A propos de la formation des accords parfaits mineurs nous avons constaté que pour obtenir des *quintes justes* dans ces accords, il fallait que les troisième et septième degrés soient modifiés de la même manière que le sixième degré.

Si on n'admet pas que l'intervalle enharmonique fasse partie intégrante de la mélodie-type, il est bien inutile de s'occuper de la gamme enharmonique. Mais, alors, il est tout aussi inutile de s'occuper des *dièses* et des *bémols;* les deux choses étant identiques, il n'est pas besoin de les expliquer de deux manières différentes. Mais comme pas un musicien ne pourrait admettre cela, il est certain que l'étude de la gamme enharmonique est indispensable.

Avant tout il faut décider lequel des deux demi-tons, *do* ♯ *ré* ou *ré* ♭ *ré* ♮ est le plus grand, car cette question qui, au premier abord, peut sembler futile est peut-être celle qui a le plus d'importance dans la théorie musicale.

Les intervalles majeurs ou mineurs changent absolument de signification quand ils ont un *comma* de plus ou de moins.

Prenons, par exemple, la seconde majeure :

Cet intervalle se trouvant dans le rapport 8—9 des sons harmoniques ne peut former, *dans le mode majeur*, que l'intervalle du 1 au 2, du 4 au 5 ou du 5 au 6 (ce dernier pris comme 8 dans la série de la *dominante*) et, *dans le mode mineur*, que les secondes du 1 au 2, du 3 au 4 ou du 4 au 5.

La seconde majeure se trouvant dans le rapport 9—10 des sons harmoniques ne peut former, *dans le mode majeur*, que l'intervalle du 2 au 3, du 5 au 6 (ce dernier pris dans la série de la *sous-dominante*) ou du 6 au 7. (Dans le mode mineur on ne trouve pas théoriquement cet intervalle.)

La seconde mineure composée de *cinq commas* ne peut former, *dans le mode majeur*, que l'intervalle du 3 au 4 ou du 7 au 1. (Dans le mode mineur on ne trouve cet intervalle du 7 au 1 que lorsqu'on se sert du 7 comme *note sensible*, c'est-à-dire quand il est placé à distance de demi-ton au-dessous de la tonique.

La seconde mineure composée de *quatre commas* ne peut former, *dans le mode mineur*, que l'intervalle du 2 au 3 ou du 5 au 6. Dans le mode majeur cet intervalle n'existe pas.

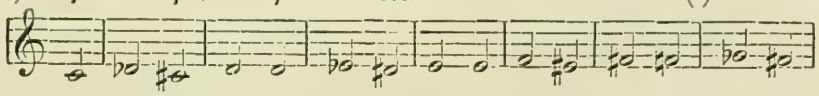
Mais, en musique, on ne se sert jamais exclusivement d'un seul mode. Dans n'importe quelle œuvre on trouve continuellement un mélange des différents modes. Voyez, comme exemple, les trois accords parfaits mineurs sur les 2^{me}, 3^{me} et 6^{me} degrés de la gamme majeure ou bien les accords parfaits majeurs sur les 3^{me} et 6^{me} degrés de la gamme mineure. La conséquence de ce fait est que, constamment, le comma doit corriger les imperfections physiques de notre système musical[1].

Comme règle générale on peut dire que lorsqu'un son fait fonction de *tierce majeure*, il doit avoir *un comma de moins*. Lorsqu'il fait fonction de *quinte* il doit avoir *un comma de plus*. Pour les sons fondamentaux on doit se servir des distances que la mélodie-type (la gamme) indique.

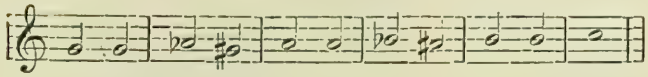
[1] Nous nous trouvons dans le même cas que l'architecte qui, pour obtenir l'effet d'une ligne droite au haut d'un portail doit faire une ligne plus ou moins courbe correspondant avec l'œil du spectateur.

Après ce qui précède il suffira d'examiner la gamme enharmonique pour être à même de savoir lequel du dièse ou du bémol est le plus haut. La gamme enharmonique peut être exécutée des deux manières que voici :

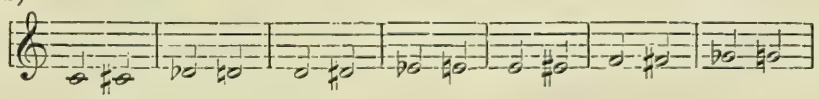
a) 7 I 7 I 7 I etc. (1)

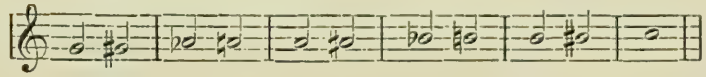


V I V I V I
en *ré* ♭ en *ré* ♮ en *mi* ♭ } et ainsi de suite.



b)





En examinant l'exemple a) on verra tout de suite que cette gamme ne diffère de la gamme chromatique que parce que les deux manières de faire les gammes chromatiques se trouvent réunies. Au lieu de monter l'échelle des sons par degrés diatoniques on la monte par degrés chromatiques.

Il n'est pas douteux que, dans l'exemple a) le demi-ton du *do* au *ré* ♭ soit composé de *cinq* commas puisqu'il est en rapport 7—1, dans le mode majeur. Il est évident que le demi-ton du *ré* ♭ au *ré* ♮ ne peut être composé que de *quatre* commas, sans quoi le rapport entre le *do* et le *ré* serait de *dix* commas, soit un comma de trop pour une seconde majeure. Admettant ce *ré* et prenant le *do* ♯ à cinq commas *comme note sensible* (7me degré) de la gamme de *ré*, il n'est pas douteux que ce *do* ♯ est d'*un* comma (intervalle enharmonique) au-dessous du *ré* ♭ précédent.

[1] On voit qu'arrivé à la fin du « tétracorde » il faut procéder de façon à ne pas se perdre dans les doubles dièses.

Par la manière d'employer la gamme enharmonique de l'exemple a) il est donc prouvé que le *ré*♭ est plus haut que le *do* ♯.

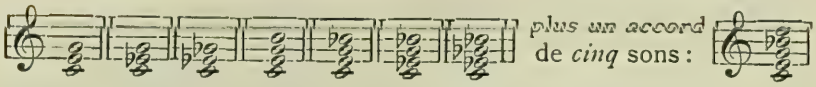
Pour bien comprendre l'exemple b) il faut d'abord examiner les diverses agrégations de sons nommées généralement « accords ». C'est ce que nous allons faire ci-après.

XI

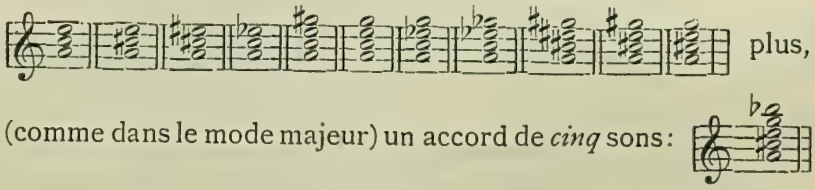
En étudiant la gamme majeure nous avons vu qu'il n'y a, en réalité, qu'un seul accord, *l'accord parfait majeur* résultant des harmoniques 4, 5 et 6. Mais, à côté de cet accord, nous en avons trouvé deux autres, comme auxiliaires, *l'accord parfait mineur* (produit par l'abaissement de la *tierce majeure*) et *l'accord de quinte diminuée* (produit par l'abaissement de la *tierce* et de la *quinte*.

Il nous reste à examiner les moyens par lesquels on obtient les combinaisons de sons auxquelles on donne aussi le nom d'accords.

Voici les accords appartenant au *mode majeur :*



Voici les accords appartenant au *mode mineur :*



Ne pouvant admettre que l'agrégation de trois sons comme *véritable accord,* nous devons séparer nettement ceux qui sont formés de trois sons de ceux qui sont formés de quatre sons.

En majeur on trouve trois accords de trois sons. Nous connaissons déjà la fonction de deux de ces accords, soit *l'accord parfait majeur* et *l'accord parfait mineur*. Quant à l'accord de *quinte diminuée* il n'a été vu, jusqu'à présent, que sur le deuxième degré, *en mineur*, ayant fonction de *sous-dominante relative*.

Dans le mode majeur ce même accord, qui se trouve sur le septième degré, ne peut avoir d'autre fonction que celle d'une *dominante sans sa fondamentale*. Mais, dans ce cas, quelle signification peut avoir la *quinte* de cet accord, *quinte* qui fait partie de la série des harmoniques de la *sous-dominante?* Il n'y a que par *les notes mélodiques étrangères à l'harmonie* qu'on puisse répondre à cette question.

Tout d'abord, prenons un accord de quatre sons, car il est évident que l'accord diminué de trois sons sur le septième degré ne peut être considéré comme un accord complet en lui-même; ce n'est *qu'une partie* d'un accord de quatre sons. Tout accord de ce genre (quatre sons) est nommé *accord de septième*, le son le plus élevé formant un intervalle de *septième* par rapport au son le plus grave ou fondamentale.

Voici quelques exemples qui démontreront que les accords « dits de septième » n'existent que par des notes mélodiques accessoires, ne faisant pas partie du *fond harmonique*.

Ces notes sont :



4° Anticipation



5° Prolongation (ou Retard)



Autrefois on classait la *pédale* parmi ce genre de notes. Il vaut mieux la considérer comme un fait tout spécial. En effet, elle n'est qu'un son soutenu, abstraction faite de la mélodie et de l'harmonie dont la marche est indépendante de la *pédale*.

Prenons, maintenant, un canevas harmonique :

a)



et brodons dessus :

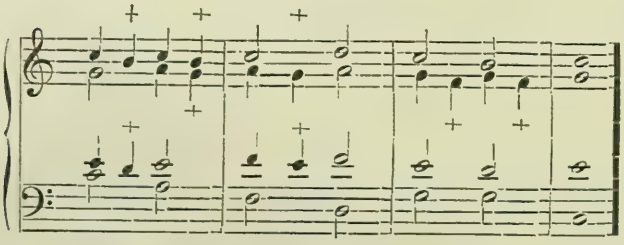
b)



c)



d)



e)



f)



g)



h)



Examinons les accords de septième qui se trouvent dans les exemples ci-dessus.

En *b*, nous voyons :

1re mesure, 2me temps, l'accord parfait *maj.* avec 7me *maj.*
» » 4me » l'accord parfait *min.* » 7me *min.*
2me mesure, 2me temps, l'accord parfait *maj.* » 7me *maj.*

En *d*, nous voyons :

3me mesure, 4me temps, l'accord parfait *maj.* » 7me *min.*

C'est cet accord qui est connu sous le nom de *septième de dominante ;* on le voit à la 3me mesure des exemples *f* et *g*.

En transposant ces exemples en mode mineur on retrouvera les mêmes accords de septième, mais ils auront une signification inverse. Tandis qu'en *majeur* les accords majeurs sont *les accords principaux* et que les accords mineurs sont *les accords auxiliaires*, on voit, en *mineur*, les accords mineurs comme *accords principaux* et les accords majeurs comme accords *auxiliaires*.

Dans les mêmes exemples nous n'avons employé que des intervalles diatoniques comme notes accidentelles; mais il n'est nullement nécessaire de procéder ainsi. Au contraire, l'emploi d'intervalles chromatiques donne plus de charme, d'élégance à ces notes.

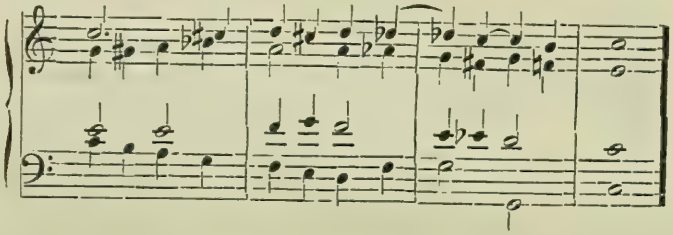
Dès maintenant nous nous servirons autant des intervalles chromatiques que des autres, car on arrive ainsi à des progressions plus riches, avec des modulations, tout en prenant le fond harmonique le plus simple.

Voici l'exemple *b* avec des notes accidentelles chromatiques :



En appliquant ce procédé aux autres exemples on obtiendra des résultats intéressants.

Mais on peut faire plus encore. Jusqu'ici nous n'avons employé, pour chaque exemple, qu'une seule espèce de notes accidentelles; mais il va sans dire que l'on se sert des diverses espèces entremêlées, ainsi que le montre l'exemple suivant :



On voit que tout en restant implicitement en *ut* nous avons fait une modulation passagère en *ré* mineur (ton relatif de la *sous-dominante*) et que l'accord parfait de *ré* ♭ majeur a été employé comme *altération* de cette même *sous-dominante.*

A l'avant-dernière mesure l'accord de *septième diminuée* (*fa* ♯, *la, do, mi* ♭, sur la *pédale sol*) nous fait sortir momentanément du cadre d'*ut* majeur, mais pour y rentrer immédiatement de la façon la plus naturelle.

Tous ces faits démontrent que dans la musique moderne on ne se borne plus à l'emploi de la gamme simple. L'altération fréquente des degrés mélodiques et harmoniques

a pris la place des degrés purement diatoniques d'autrefois. Car il faut remarquer que si, dans les exemples qui précèdent, nous n'avons fait usage que de notes accidentelles (soit diatoniques soit chromatiques) mises en relations directes avec les notes réelles, il n'y a aucune raison pour ne pas les employer sans que ces notes réelles soient entendues. Ainsi, le dernier exemple pourrait être présenté sous la forme suivante :

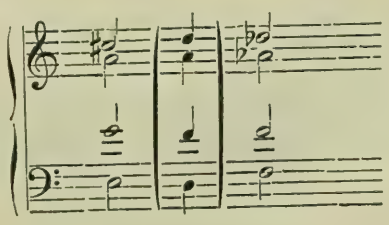


Nous croyons avoir suffisamment démontré que n'importe quelle combinaison de sons nommée « accord » peut avoir plusieurs significations si on la considère comme *accord altéré*.

Dans le dernier exemple il y a deux accords dont l'enchaînement doit tout particulièrement nous intéresser. Ce sont ceux qui, à la seconde mesure, sont marqués d'une croix.

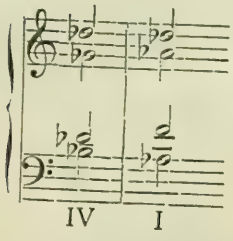
En les comparant aux accords placés au 2^{me} et au 3^{me} temps de l'avant-dernier exemple on comprendra que, dans cet enchaînement, les notes réelles sont supprimées.

Ex.

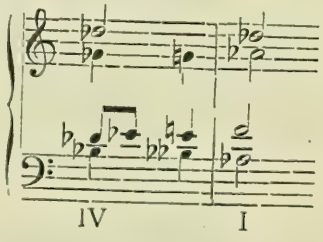


Mais cette succession d'accords comporte en soi deux explications bien différentes que voici:

1°



ou avec des notes accidentelles par degrés chromatiques:



Envisagé de cette façon, cet exemple donne une résolution *plagale* qui peut avoir le sens d'une cadence finale pourvu que la basse descende à la note fondamentale de la *tonique*. Il n'y a rien à dire contre la marche de la basse puisque la *sous-dominante* peut porter l'accord parfait mineur sans perdre son caractère.

La seconde explication est non moins importante:

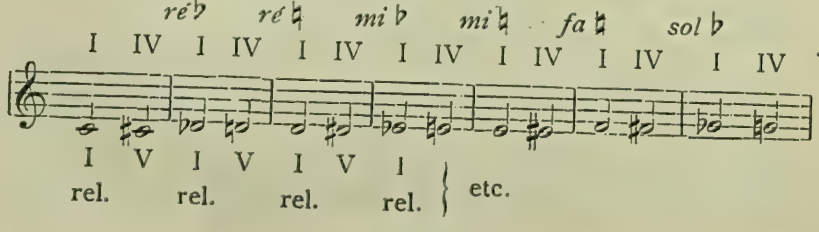
2°



ou avec des notes accidentelles par degrés chromatiques et enharmoniques:



Ces deux derniers exemples donnent la clé de la *seconde* gamme enharmonique dont la signification est:





On rencontre beaucoup d'applications de cette suite d'accords dans les œuvres modernes.

Dans cette gamme enharmonique, comme dans l'autre, l'intonation du *do* ♯ doit être plus basse que celle du *ré* ♭. Il faut même faire entendre la différence entre l'intonation des deux sons qui ont le même nom: *ré—ré*, *mi—mi*, etc., le premier de chacun de ces sons ayant le sens d'une sorte de *sensible* se résolvant sur la *tonique*.

XII

Au point où nous sommes arrivés, maintenant, nous pouvons voir le système musical entièrement constitué.

Dorénavant nous devrons faire usage des *sons fixes*, mais en ne leur attribuant qu'une valeur relative, car ce n'est que par leur signification qu'ils peuvent être utilisés.

Si compliquée que soit une œuvre musicale, les sons dont elle est composée ne sauraient avoir d'autre fonction que: 1, 2, 3, 4, 5, 6, 7, 1, ou les altérations de ces degrés. Aussi le musicien, qui possède bien la technique de son art, doit-il être à même de trouver la suite d'une mélodie, n'en eût-il entendu que quelques intervalles.

Il est donc temps de démontrer le sens et le rôle des intervalles.

Commençons par faire remarquer qu'en général n'importe quel intervalle se trouve dans les relations simples des degrés de la gamme majeure. Voyez la table suivante:

Le Prime = Seconde diminuée: *do ré*♭♭.
La Seconde mineure = Prime augmentée *do do*♯.
La Seconde majeure = Tierce diminuée: *do mi*♭♭.
La Tierce mineure = Seconde augmentée *do ré*♯.
La Tierce majeure = Quarte diminuée *do fa*♭.
La Quarte juste = Tierce augmentée *do mi*♯.
La Quarte augmentée = Quinte diminuée *do sol*♭.
La Quinte diminuée = Quarte augmentée *do fa*♯.
La Quinte juste = Sixte diminuée *do la*♭♭.
La Sixte mineure = Quinte augmentée *do sol*♯.
La Sixte majeure = Septième diminuée *do si*♭♭.

La Septième mineure = Sixte augmentée *do la* ♯.
La Septième majeure = Octave diminuée *do do* ♭.
L'Octave juste = Septième augmentée *do si* ♯.

L'étude des intervalles ne peut donc avoir d'autre but que de faire apprendre et bien comprendre aux élèves :

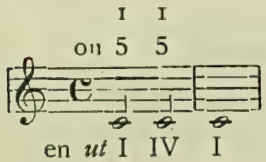
I° La différence d'un *comma* qui existe entre les intervalles de dénomination différente;

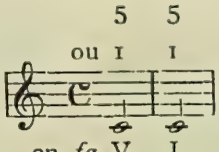
II° La justesse absolue;

III° La signification *artistique* de chaque intervalle; nous voulons dire par là que chaque intervalle a son rôle à part dans l'art musical.

Entreprenons, maintenant, l'étude des intervalles. Dans les exemples suivants les chiffres indiquent la signification; les notes n'indiquent que l'aspect de la phrase si l'on prend l'*ut* comme point de départ.

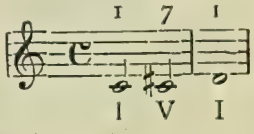
Primes.





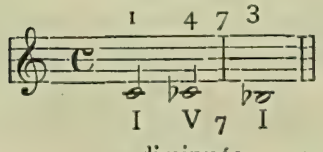
justes

Modulation d'*ut* à *ré*



augmentée

Modulation d'*ut* à *sol*♭



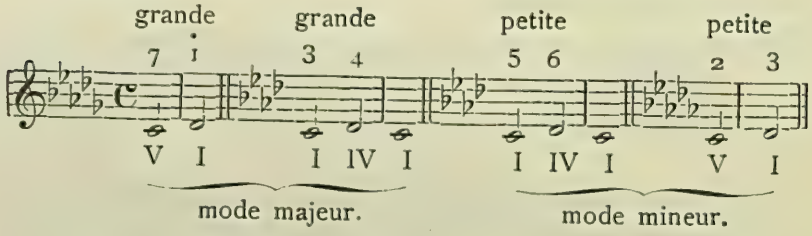
diminuée

Secondes.

Majeures

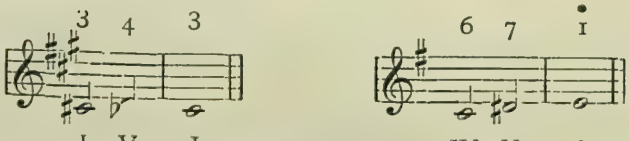


Mineures



diminuée
Modulation
de *la* à *la♭*

augmentée



pris dans la
gamme enharmonique.

mode mineur.

Tierces.

Majeures



tierces de 18 commas tierces de 17 commas



mode mineur

Mineures

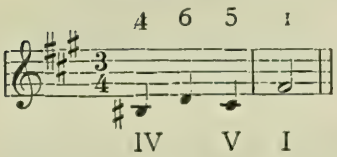


mode majeur



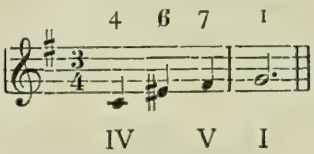
mode mineur

diminuée



mode mineur.

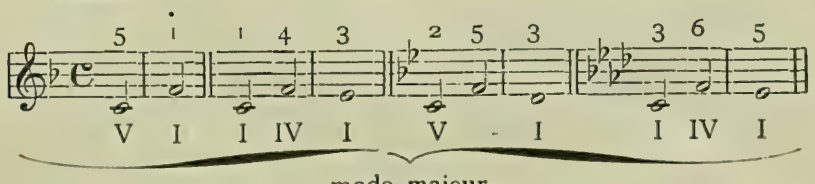
augmentée



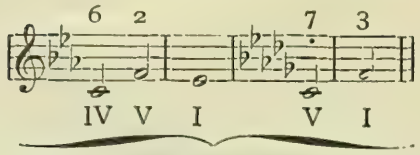
mode majeur.

Quartes.

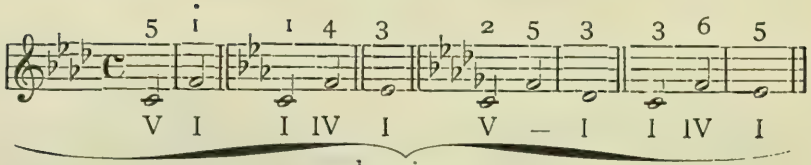
Justes



mode majeur

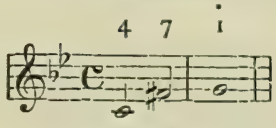


mode majeur

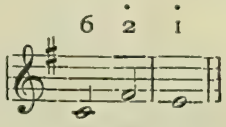


mode mineur

augmentée.



mode majeur ou mineur.



mode mineur.

diminuée.



mode mineur.

Les autres intervalles, *quintes, sixtes, septièmes* et *octaves* ne pouvant être considérés que comme le renversement des quatre premiers, il est inutile de les faire figurer ici[1].

L'importance de l'étude des intervalles est, maintenant, bien prouvée. En outre nous espérons avoir démontré clairement que cette étude ne peut être faite par les jeunes enfants.

Ce n'est qu'après avoir compris parfaitement la constitution de la gamme et des accords mis en rapport avec le rythme qu'on est apte à se rendre compte de tout ce qui ressort de l'étude des intervalles.

[1] Seule la *septième mineure* fait exception. Cet intervalle fait penser à l'accord de *septième de dominante*.

XIII

L'étude des intervalles est, naturellement, la préparation à celle des modulations car, ainsi que nous l'avons dit, *il suffit de changer la place rythmique d'un intervalle pour moduler.*

En caractérisant par des accords les sons qui forment une mélodie, il sera d'autant plus facile de modifier la signification de ces mêmes sons pourvu qu'on n'oublie pas le rôle prépondérant du rythme dans la modulation. Pour moduler on peut donc faire usage soit du rythme seul, soit du rythme combiné avec l'harmonie.

Le principe de la modulation par le rythme seul n'est autre que celui que nous avons énoncé à propos de la formation de la gamme, savoir :

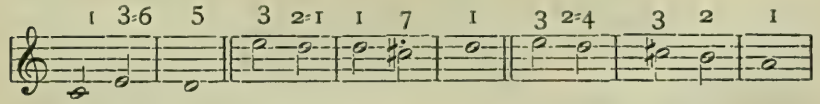
Tout son qui se trouve placé sur le temps fort représente une tonique.

Ce même son, placé sur un temps faible, ne peut être qu'une des deux dominantes.

Le principe de la modulation par le rythme associé aux accords est :

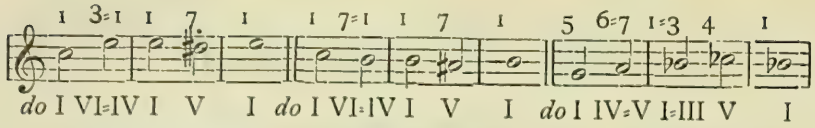
Donner à un accord quelconque une place rythmique qui lui assigne le rôle d'une des deux dominantes.

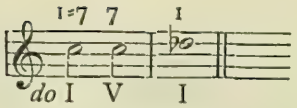
Voici quelques exemples de modulations effectuées par l'influence du rythme seul :



do I = IV *sol* I *do* I V=IV I V I *do* I II=IV I V I

ré *la* min. *la* majeur





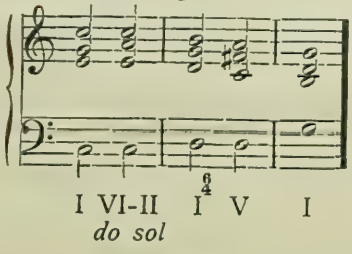
etc.

Ces exemples suffisent comme preuves.

Ils montrent, en outre, que même dans les modulations mélodiques l'harmonie joue un rôle très important. Voici, maintenant, des modulations dans lesquelles le rythme et les accords sont associés :

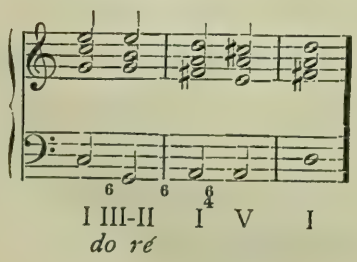
Ire série.

de 1 à 5



formule : le 6me degré devient 2me.

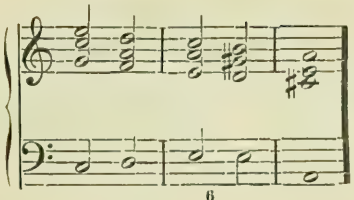
de 1 à 2



Formule : le 3me degré devient 2me.

IIme série.

de 1 à 6.

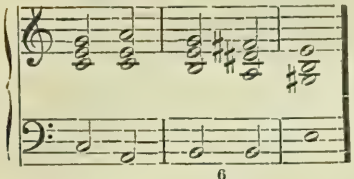


I II-IV $\frac{6}{4}$ I V I

do la min. *la* majeur

Formule : le 2me degré devient 4me dans le ton mineur.

de 1 à 3

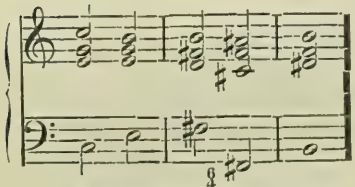


I VI-IV $\frac{6}{4}$ I V I

do mi min. *mi* majeur

Formule : le 6me degré devient 4me dans le ton mineur.

de 1 à 7



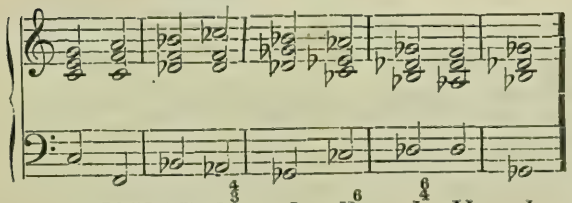
I III-IV $\frac{6}{4}$ I V I

do si min. *si* majeur.

Formule : le 3me degré devient 4me dans le ton mineur.

IIIme série

1 à 4 ou 5.

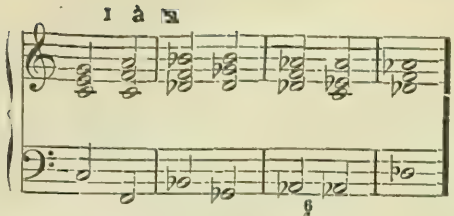


I IV-V $\frac{4}{3}$ I-III V I II^{6} $\frac{6}{4}$ I V I

do si♭ min. *sol*♭ majeur

Formule :

Le IVme degré devient Vme degré, lequel se résout sur la tonique d'une gamme mineure ; cette tonique est égale au IIIme degré de la nouvelle tonalité.

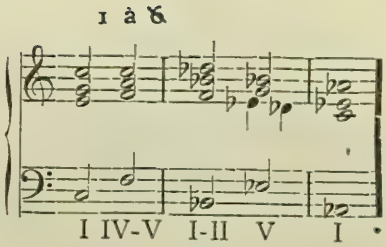


I IV-V I-IV IV $I^{\frac{6}{4}}$ V I

do si ♭ min. *ré* ♭ majeur

Formule :

Le IV^me^ degré devient V^me^ degré, lequel se résout sur la tonique d'une gamme mineure; cette tonique est égale au VI^me^ degré de la nouvelle tonalité.

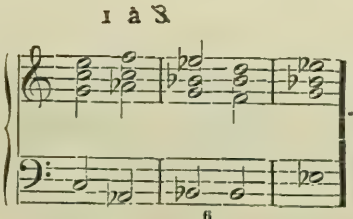


I IV-V I-II V I

do si ♭ min. *la* ♭ majeur

Formule :

Le IV^me^ degré devient V^me^ degré, lequel se résout sur la tonique d'une gamme mineure; cette tonique est égale au II^me^ degré de la nouvelle tonalité.



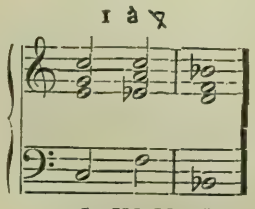
I-V^{6} I-II^{6} $I^{\frac{6}{4}}$ V I

do fa min. *mi* ♭ majeur

Formule :

Le I^er^ degré devient V^me^ degré, lequel se résout sur la tonique d'une gamme mineure; cette tonique est égale au II^me^ degré de la nouvelle tonalité.

IV^me^ série.



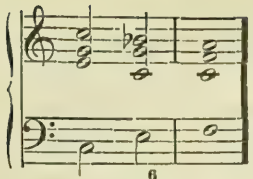
I IV-V I

do si

Formule :

Le IV^me^ degré devient V^me^ degré dans la nouvelle tonalité.

1 à 4



I — V I
do fa

Formule :

Le I^er^ degré devient V^me^ degré dans la nouvelle tonalité.

Les exemples ci-dessus indiquent différentes manières de faire une modulation.

Dans la *première série* un des accords de la tonalité qu'on se propose de quitter change de signification.

Dans la *deuxième série* le même procédé conduit, par la tonalité mineure, du même diapason, à la tonalité nouvelle.

Dans la *troisième série* la marche est un peu plus compliquée. L'accord de *sous-dominante* sert de *dominante* dans une tonalité mineure. Aussitôt que la résolution sur la *tonique* a lieu, on trouve un accord qui a sa fonction dans la gamme vers laquelle on a voulu moduler. En regardant les exemples on verra que l'accord de *si* ♭ *mineur* est :

Dominante relative	Tonique relative	Sous-dominante relative
en *sol* ♭.	en *ré* ♭.	en *la* ♭.

La modulation est donc absolument directe. Entre le ton d'*ut, point de départ*, et le *sol* ♭, *ré* ♭ ou le *la* ♭, *point d'arrivée*, il n'y a pas d'autres tonalités.

Dans la *quatrième série* on ne trouve qu'un changement de fonction de la *tonique* ou de la *sous-dominante* en DOMINANTE.

Il nous reste à donner la raison pour laquelle nous avons fait usage, pour moduler, des accords qui se trouvent dans l'exemple ci dessus.

Dans toute gamme la relation des degrés entre eux change plus ou moins. Or les accords que nous avons employés sont ceux qui précisent le mieux, pour l'auditeur, le rapport des intervalles de l'ancienne tonalité avec ceux de la nouvelle.

On pourrait dire que là est le secret d'une belle modulation.

Examinons à ce point de vue quelques exemples.

= Modulation de 1 à 5. =

Quelle est la différence entre la gamme d'*ut* et celle de *sol?*

— Il n'y a que le son *mi* qui constitue une différence. Le *mi* (3me degré) en *ut* est la *tierce* par excellence. En *sol*, le *mi* (6me degré) est le degré changeant, plutôt *quinte* que *tierce*.

Dans notre modulation le *mi* qui était *tierce* devient *quinte* et par ce fait, seul, qui entraîne à un 6me degré haut, nous nous sommes rapprochés de la gamme de *sol*.

= Modulation de 1 à 2. =

Quelle est la différence entre la gamme d'*ut* et celle de *ré?*

— Dans la gamme d'*ut* le *mi*, le *la* et le *si* sont les degrés changeants; dans la gamme de *ré*, le *mi* et le *la* sont les degrés immuables. Le *si*, seul, est changeant en sa qualité de 6me degré et il a toujours une tendance vers la fonction de *quinte*.

Dans notre modulation l'emploi de l'accord du 3me degré oblige l'exécutant à l'intonation du *mi* et du *si* hauts et, par ce fait, seul, l'auditeur n'entend plus cet accord comme accord de la gamme d'*ut*, mais bien comme accord appartenant à une nouvelle tonalité.

Il nous semble inutile de soumettre tous nos exemples de modulations à un pareil examen. Sauf dans la dernière série on retrouvera le même principe. Mais, dans cette série, le cas est différent parce qu'il s'agit de *dominantes* qui se résolvent sur leurs toniques et qu'une telle résolution ne peut laisser aucun doute[1].

Cependant il y a encore une modulation qui doit attirer notre attention : c'est celle du [illegible] au [illegible].

Cette modulation est effectuée par le changement de

[1] Faisons remarquer ici combien l'art musical représente la vie. Pour faire un pas en montant vers la *dominante* on est obligé de modifier les relations pures des degrés d'une tonalité. Au contraire, pour descendre du côté de la *sous-dominante* tout va de soi-même. Il est facile de descendre.

En est-il autrement dans la vie?

signification de la *sous-dominante* qui, considérée comme *dominante*, se résout sur une *tonique*, dans le mode mineur. Cette tonique mineure constitue le 3me degré de la nouvelle tonalité majeure. Or, l'accord du 3me degré exige une altération du 7me degré de la gamme pour que la *quinte* soit juste (31 commas). Rappelons que pour être *note sensible* le 7me degré doit être la *tierce* de la *dominante* sans quoi le rapport entre le 7me degré de la *tonique* ne serait plus juste.

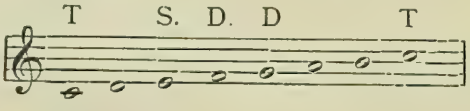
Il est donc indispensable qu'à l'accord du 3me degré succède l'accord de *dominante* (de préférence avec la *septième*), pour que la véritable relation entre la *sensible* et la *tonique* soit claire. Sans cette précaution l'auditeur croirait à une modulation de 1 à 2 ou de 1 à 6.

XIV

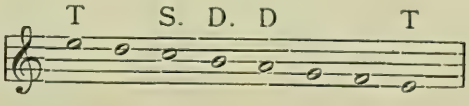
Avant de pouvoir parler utilement des modulations du mode mineur il faut nous pénétrer de la « théorie dualiste » que Riemann a fait connaître.

Selon cette théorie tout ce que nous avons dit sur le mode majeur, *en montant*, peu s'appliquer au mode mineur, *en descendant*.

La gamme majeure monte, ainsi, du *do* au *do* :



La gamme mineure descend, ainsi, du *mi* au *mi* :



Comme nous l'avons dit plus haut, cette théorie peut s'appliquer à toute œuvre musicale dans laquelle le contrepoint *seul* (sans préoccupation du résultat harmonique) sert de base. Les ouvrages des anciens contrepointistes et même certains ouvrages de J.-S. Bach reposent sur cette interversion sans que le sens musical en soit sensiblement altéré. Il ne serait pas impossible qu'une nouvelle génération de musiciens usât des ressources qu'offre cette conception que,

théoriquement parlant, on peut qualifier d'admirable. Mais pour cela il faut cesser de considérer l'harmonie comme une des bases de l'art musical. Tant qu'elle sera partie inhérente de cet art on se trouvera en présence d'une difficulté très grande. Lorsqu'on entend un accord on est bien à même de comprendre un changement de signification de cet accord, mais on n'est pas à même de ne pas entendre sa note la plus grave comme fondamentale. Donc, la manière d'employer les éléments dont l'accord est formé (et, surtout, la note fondamentale) sera toujours décidée par cette note fondamentale même.

Aussi, dans les accords suivants, ce seront les notes graves qui sembleront être les fondamentales sur lesquelles les accords sont construits, quoique la théorie dont il est question nous dise que, dans les trois derniers accords, *ce sont les notes supérieures* qui sont les sons générateurs.



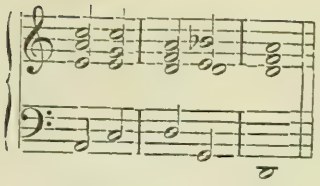
Malgré cette difficulté qu'on ne peut nier, il nous reste dans la musique moderne (malgré l'influence harmonique) assez de données mélodiques, surtout dans les modulations, pour que nous puissions appliquer avec succès la théorie géniale du célèbre Riemann.

Pourvu que l'on veille soigneusement à la marche de la basse, on peut pratiquer rigoureusement l'interversion des modulations qui ont été données comme exemples en mode *majeur*.

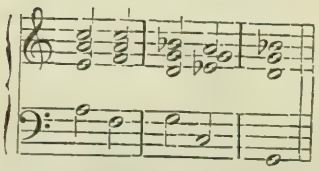
Voici les mêmes exemples, en *mineur*, antipode du *majeur* :

Ire série.[1]

de 1 à 5

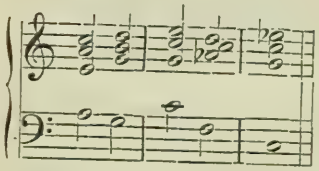


de 1 à 2

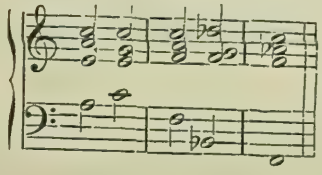


IIme série.

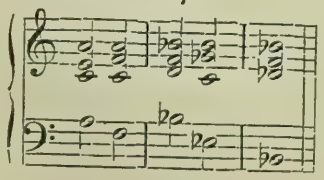
de 1 à 6



de 1 à 3

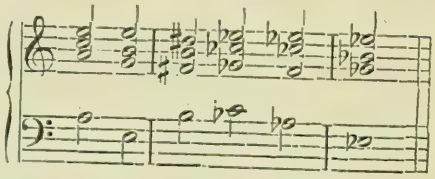


de 1 à 7

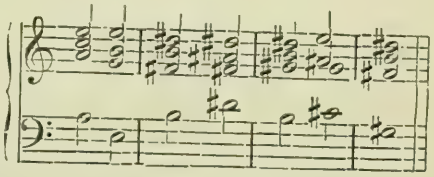


IIIme série.

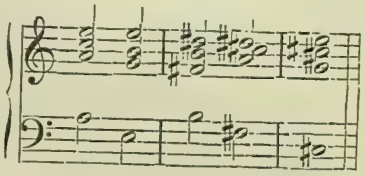
de 1 à 5 ou 4



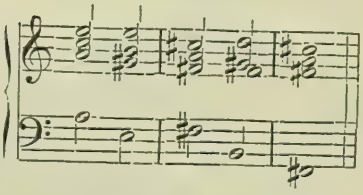
de 1 à 2



de 1 à 6

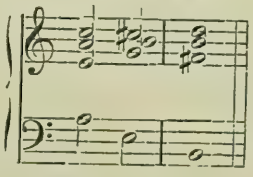


de 1 à 3

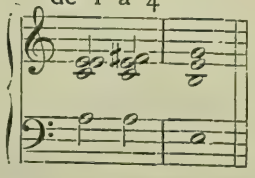


IVme série.

de 1 à 7



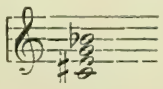
de 1 à 4



[1] Dans ces modulations en mode *mineur* les formules et les chiffres indiquant les degrés sont les mêmes que dans le mode *majeur*.

En dehors des modulations par le rythme et par les accords diatoniques, il y a encore d'autres moyens de moduler. Parmi ces moyens un des plus employés dans les œuvres modernes consiste dans l'altération d'un ou de plusieurs sons d'un accord. En outre, les changements enharmoniques offrent aussi de grandes facilités.

Prenons, par exemple, un accord de *septième diminuée :*

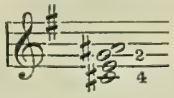


Si on change *quatre fois* le nom de chacun des sons qui forment cet accord, on peut le résoudre dans *quatre tons mineurs* différents.

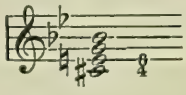
En le considérant comme *accord altéré* on pourra s'en servir comme de *sous-dominante* d'une gamme *majeure* ou *mineure* et, de nouveau, il se trouvera dans quatre autres tons.

Quand, dans le mode majeur, on emploie l'accord de *septième diminuée* comme accord altéré, il doit être pris *comme accord relatif* de *sous-dominante*, soit : $\overset{i}{\underset{2}{\overset{6}{4}}}$ dans lequel les 2^me^ et 4^me^ degrés sont altérés. Employés en *mineur* ce sont les 4^me^ et 6^me^ degrés qui seront altérés. Exemple :

En *sol* majeur



En *sol* min.



Ce seul accord donne donc la possibilité de moduler en *ré*, en *fa*, en *la* ♭ ou en *si mineurs* ou bien en *sol*, en *si* ♭, en *ré* ♭ ou en *mi majeurs* ou *mineurs*.

Cela nous entraînerait trop loin d'indiquer, même par un simple aperçu, tous les moyens par lesquels on peut effectuer une modulation. Il suffit d'en avoir donné une idée après avoir posé, à l'aide de nos exemples, le principe général auquel on ne peut déroger sous peine de s'égarer complètement.

XV

Il nous reste à donner un exposé de la signification que tout son, tout intervalle et tout accord *isolés* ont en musique.

I. *Les sons isolés.*

Un son isolé produit toujours l'effet d'une *tonique.* Pourquoi?

Parce que n'importe quel son musical venant interrompre le silence *paraît placé sur un « thésis ».*

Le silence qui suit l'audition d'un son isolé confirme absolument cet effet.

II. *Les intervalles.*

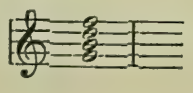
Dans la partie de cet ouvrage consacrée aux intervalles, leur signification a été suffisamment démontrée.

III. *Les accords.*

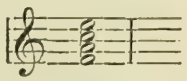
L'accord parfait majeur: représente toujours la *Tonique,* à moins que le rythme, le plaçant sur un temps faible, ne la fasse paraître comme une des deux *Dominantes.*

L'accord parfait mineur: représente toujours la *Sous-Dominante,* à moins que le rythme, le plaçant sur un temps fort, ne le fasse paraître une *Tonique* dans le mode mineur.

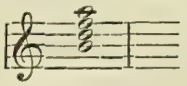
Les accords de septième: se composant d'un des deux accords parfaits, auxquels est jointe une note auxiliaire qui produit l'intervalle de septième avec la note fondamentale de l'accord, ces accords ne peuvent représenter qu'une des deux *Dominantes.* Les accords de septième sont:

1. Septième Dominante V^me^ degré en majeur et en mineur.  D

2. Accord parfait mineur avec septième mineure II^me^ degré en majeur.  SD

3. Accord parfait majeur avec septième majeure VI^me^ degré en mineur.  SD

4 Accord diminué avec septième mineure II^me^ degré en mineur (altération du N° 2).  SD

5. La même accord que le précédent avec une autre signification. VII^me^ degré en majeur.  D

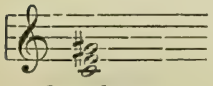
Cet accord est en effet, un accord de Dominante avec septième et neuvième majeure, auquel manque le son fondamental *sol*.

6. Accord de quinte diminuée : VII^me^ degré en mineur. 

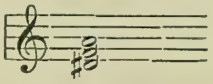
Cet accord a la même signification, en *mineur*, que celle de l'accord n° 5 en *majeur*. La note fondamentale, ou *dominante*, est supprimée.

Tout accord, même l'accord parfait majeur, peut être altéré. Dans ce cas sa signification est toujours celle de *sous-dominante* ou de *sous-dominante relative*. La raison de ceci est que jamais une *tonique* ne peut être comprise comme telle dès qu'une note de l'accord est altérée. Dans l'accord de *dominante* la *quinte* peut être altérée mais il ne faut toucher ni à la *tierce* ni à la *fondamentale* parce qu'alors l'accord perd son caractère de *dominante*.

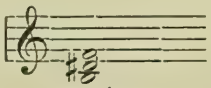
Outre les accords mentionnés ci-dessus on trouve encore les suivants :



3^me^ degré
en mineur



4^me^ degré
en mineur
avec altération de
la *fondamentale*.



2^me^ degré
en mineur
avec altération de
la *tierce*.

A chacun de ces accords on peut adjoindre une *septième*.

CONCLUSION

Nous ne terminerons pas cet exposé de la théorie générale de la musique sans faire remarquer que l'étude de l'intervalle enharmonique (le *comma*) en est un des points les plus importants et les plus intéressants. C'est par cette étude que l'on peut se rendre compte du chemin parcouru depuis les premières manifestations de l'art musical jusqu'à nos jours.

Par des exemples tirés des œuvres des grands maîtres je prouverai que si on n'a pas étudié cette question d'une manière approfondie, on ne peut être à même de comprendre le véritable sens de la phrase musicale la plus simple. Or, comment interpréter ce qu'on ne comprend pas?

En ce qui concerne l'enseignement élémentaire j'espère avoir démontré que la musique doit être étudiée *comme on étudie une langue* et que, au début, on ne doit avoir recours à aucun instrument pour l'enseigner. Ce n'est que lorsque l'élève sera arrivé à comprendre et à se servir de la musique *comme d'une langue* que l'usage d'un instrument pourra rendre vraiment des services.

IMPRIMERIE ALSACIENNE anc^t G. FISCHBACH, STRASBOURG. — 1666

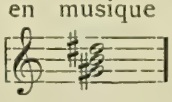
ERRATA ET RECTIFICATIONS

Page 39. En parlant du septième degré, l'auteur a voulu indiquer le degré que représente le chiffre 5 dans la gamme mineure,

De même le 2me au 3me degré et le 5me au 6me degré, à la page 40.

Page 51. Dans l'exemple « a », la partie de contralto doit chanter un « la », non un « sol », dans le second accord.

Page 55. Le second *do* de l'exemple en musique doit être diézé.

Page 72. Le second exemple en musique de la IIIme série se termine par l'accord 

Page 75. 5. *Le* au lieu de *La*.

6. Accord de septième diminuée.

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A

SUCCINCT

THOROUGH-BASS SCHOOL.

BY

W. A. MOZART.

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LONDON:

J. ALFRED NOVELLO, 69, DEAN STREET, SOHO, AND 35, POULTRY;

ALSO IN NEW YORK, AT 6, ASTOR PLACE.

1854.

Brompton, Dec. 18, 1854.

Dear Sir,—In reply to your question as to the circumstances connected with the origin of Mozart's Succinct Method of Thorough-Bass, I have to say, that in an interview which I had with the Abbé Stadler at Vienna, in 1827, he informed me that such a work was written for his niece by Mozart. This young lady was Mozart's pupil in pianoforte playing and harmony; and friendship for her, and for her uncle, made him undertake the task. I am pretty certain that together with a portion of the manuscript sheets of the *Requiem*, which the Abbé showed me, I saw also those of this little book; the former work, of course, from its great interest, has the stronger hold on my memory.

However, of the authenticity of the Thorough-Bass there can be no doubt. I believe that a little book published at Berlin, under the title *Kurz Gefaszte Methode der General Bass Von W. A. Mozart*, is the work in question.

To some it may appear improbable that so great a master should undertake such dry labour; but not so to those who know the facts of Mozart's history and the great benevolence of his character. In his day there were no books of harmony which taught compendiously all that was necessary to be known of the due proportion of intervals, and the correct designation of the notes of chords; each master taught as he could by tradition. It is a fresh proof of Mozart's comprehensive power in all which appertained to his own art, that he could condense in a few brief pages, on the spur of the moment, everything that the treatment of the subject required. The execution is eminently practical, without the expenditure of a single superfluous word.

The venerable priest who showed me the manuscripts, though past his 80th year, had a countenance glowing with animation while he spoke to me of his friend Mozart—the composer and the man.

I am, dear Sir, yours very truly,

E. Holmes.

J. A. Novello, Esq.

MOZART'S

SUCCINCT THOROUGH-BASS SCHOOL.

I.

Fundamental Principles of Thorough-Bass.

Ten figures are used in thorough-bass to represent intervals: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10; the unison, the second, the third, the fourth, the fifth, the sixth, the seventh, the octave, the ninth, and the tenth; which last merely reproduces the third. When three of these ten figures are played with the bass note, they form a four-note chord; when two are played, they form a three-note chord.

Chords are called perfect, imperfect, and dissonant. There are only two perfect chords; one consists of a minor third, perfect fifth and octave; the second consists of the major third, perfect fifth and octave. Example:—

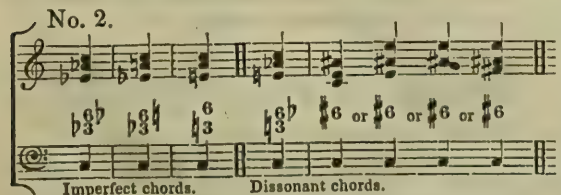
No. 1.



Remark.—When the perfect chord $\frac{8}{5}_{3}$ is to be played, only one of these figures, or even a ♭, ♮, or ♯ is written above the fundamental note; sometimes no figure at all is used; but if two intervals of this chord are contradicted by two others, these intervals must be marked by their figures, thus: $\frac{6}{4}$ $\frac{5}{3}$, $\frac{9}{4}$ $\frac{8}{3}$.

The imperfect chords are also two in number, marked $\frac{8}{6}_{3}$ and $\frac{8}{6}_{4}$, and are called the chord of the sixth and the chord of the six-four. The first may contain a minor third, minor sixth, and octave; or, a minor third, major sixth, and octave; or, a major third, major sixth and octave. When it differs in these intervals, it belongs to the dissonant chords. For example, on C:—

No. 2.



The chord of the six-four can only be used in two ways as an imperfect chord, viz., with a perfect fourth, major sixth and octave; and with a perfect fourth, minor sixth and octave. When the fourth is diminished or augmented, the chord belongs to the dissonants; for example:—

No. 3.



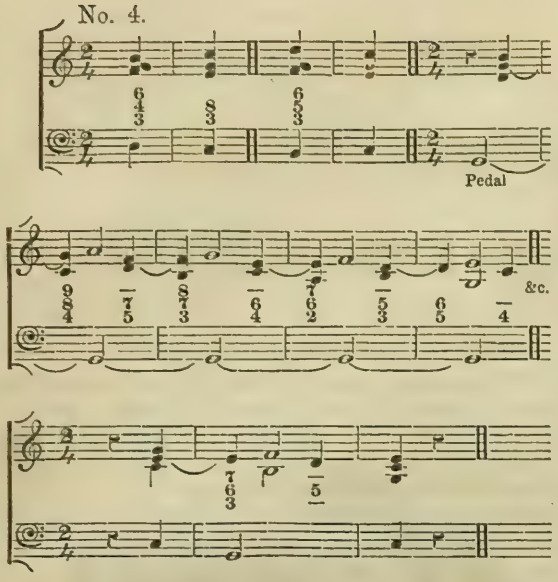
Dissonant chords contain all the three seconds; the diminished third; the diminished and augmented fourth; also the perfect fourth accompanied by the fifth and octave; the diminished and augmented fifth; even the perfect fifth, when in conjunction with the sixth, as in the $\frac{6}{5}_{3}$, or $\frac{8}{6}_{5}_{4}$. The diminished and augmented sixth; all three sevenths; the diminished octave and the augmented unison, which last is figured by some composers as the augmented octave; the two ninths, and the diminished tenth; whatever accompaniment they may have.

II.

In order that the foregoing and following instructions may be more clearly understood, the usual intervals without accompaniment may be seen above the fundamental note C. The master must often examine his pupil in other keys, and at the same time tell him, that the perfect unison, the minor and major third, the perfect fifth, the minor and major sixth, the perfect octave, the minor and major tenth, are alone *consonant* intervals; but that the augmented unison, the minor, major, and augmented second, the diminished third, the diminished, perfect, and augmented fourth, the diminished and augmented fifth, the diminished and augmented sixth, the diminished, minor and major seventh, the diminished octave, the minor and major ninth, the diminished tenth, are *dissonant* intervals.

Remark.—When two figures are placed one above the other, the lower one is considered as dissonant, although when alone, it might be either consonant or dissonant; such as, $\frac{4}{3}$ $\frac{6}{5}$ $\frac{7}{6}$ $\frac{9}{8}$ $\frac{8}{7}$:—

No. 4.



EXPLANATION OF ALL INTERVALS OVER C.



III.

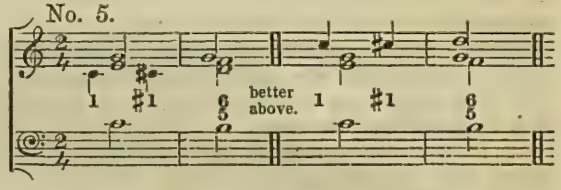
The ten intervals are, by means of the accidental signs, ♭, ♯, ♮, ♭♭, ×, made diminished, augmented, minor, major, and perfect. It is necessary to know how much an interval may be varied, and what other intervals may belong to it. This will be written in three-note and four-note figured chords, and must be learnt by memory—see tables (page 13).

THE UNISON.

The unison is two-fold, namely: perfect 1 and augmented 1♯. When two parts meet on a note (as C, C—C♯, C♯), a perfect unison is produced.

The augmented unison consists of a minor semitone, as C, C♯—D, D♯, &c.; and is, in four-note chords, better and oftener used an octave higher, and merely occurs as a passing note. The perfect unison mostly takes the place of the octave; for example:—

No. 5.



THE SECOND.

The second is three-fold, namely: minor, major, and augmented, ♭2, 2, ♯2; for example:—

No. 6.

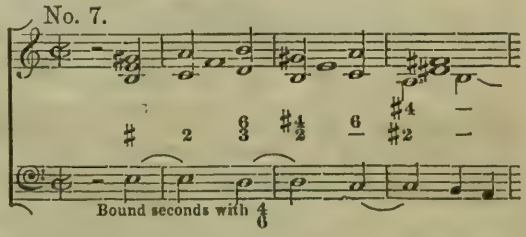


The first consists of a major semitone, the second of a whole tone, the third of a whole tone and a minor semitone. All three are accompanied by a fourth and sixth, according to the key.

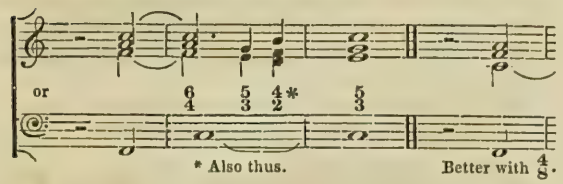
Remark.—When the major second is a passing note, the major seventh or perfect octave may be used as well as the perfect fourth; when the second, however, is not a passing note, and occurs in the accented part of a bar, it is usually used as a preparation, prepared in the bass, and in that part resolved into a third by descending a semitone or a whole tone.

In counterpoint, the fifth is often met with, written above the second, $\frac{5}{2}$; in this case, the fifth or second itself may be doubled as the fourth part. The following examples illustrate the cases mentioned:—

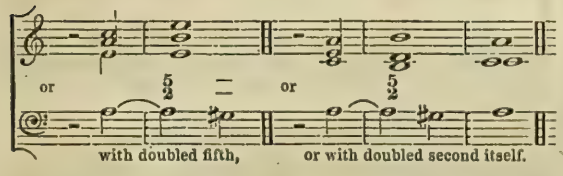
No. 7.







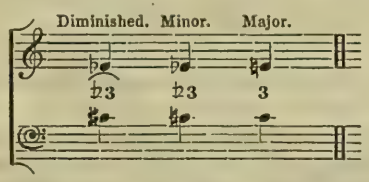




The Third.

The third is three-fold, namely: diminished, minor and major. The first consists of two major semitones, the second of a whole tone and major semitone, the third of two whole tones; for example:—

No. 8.

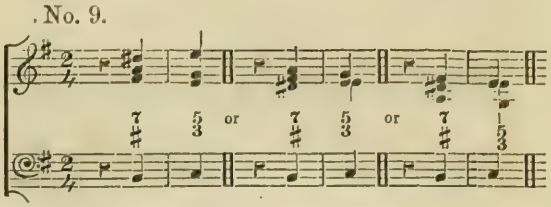


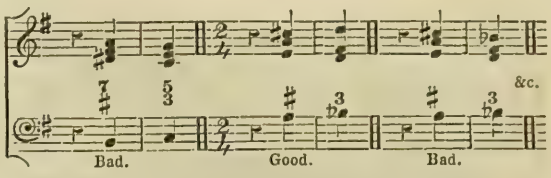
The first, which occurs but seldom, and usually has a curved mark (⌒) over it, is accompanied by the diminished fifth and diminished seventh.

To the minor and major thirds, which occur very often, belong the fifth and octave, or the unison instead of the octave, which may be omitted altogether in playing.

Remark.—When an accidental alone is written above the bass notes, it signifies the third, and therefore the whole minor or major chord. It is usual to double the third, in a major third chord, in order to avoid the augmented second progression; particularly after a dominant seventh, or after a major third with ♮, which is the leading note, and always requires to ascend a semitone. For example:—

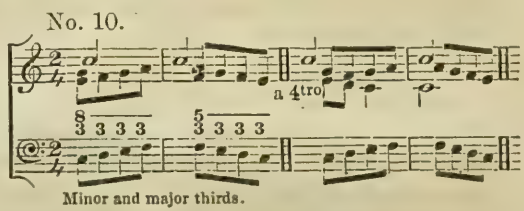
No. 9.

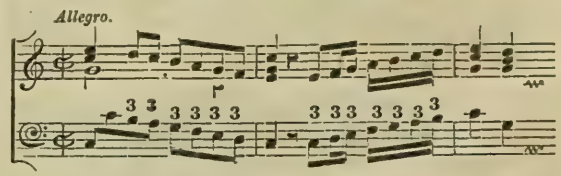




Should many thirds or tenths follow each other, the first or last are played in four parts, the intermediate in three or two parts; the last is best in quick passages; for example:—

No. 10.





The Fourth.

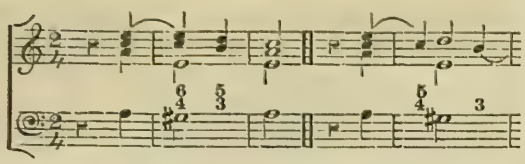
The fourth is three-fold; the diminished, perfect, and augmented, ♭4 or ♯4—4—♯4. The first consists of two major semitones, and one whole tone. The second or perfect, of two whole tones, and one major semitone. The augmented, of three whole tones; for example, over D and C♯:—

No. 11.



To the diminished is usually added the minor sixth, and then this sixth is doubled as fourth part (see No. 12). Should the diminished fifth be written above the fourth, the diminished sixth may also be used as fourth part (see No. 13). Should an author wish a diminished seventh in this chord, it must be marked by its figure (see No. 14):—

No. 12. No. 13.

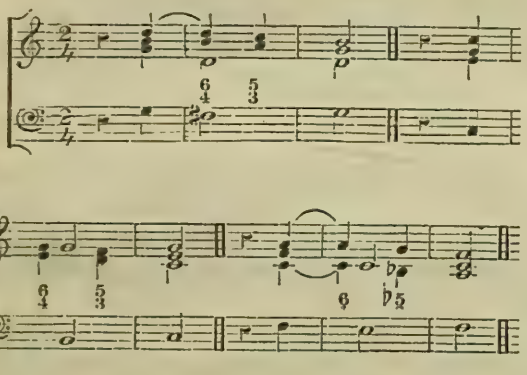


No. 14.



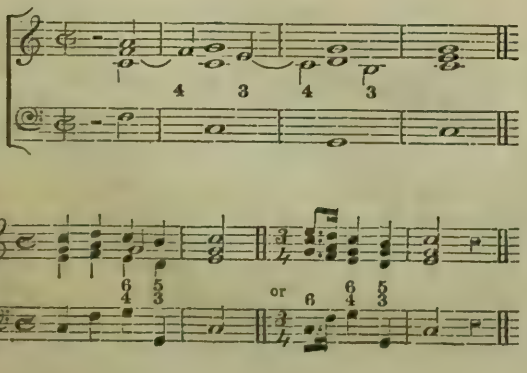
The sixth may be doubled with the perfect fourth, when the diminished, instead of the perfect fifth follows; for example:—

No. 15.



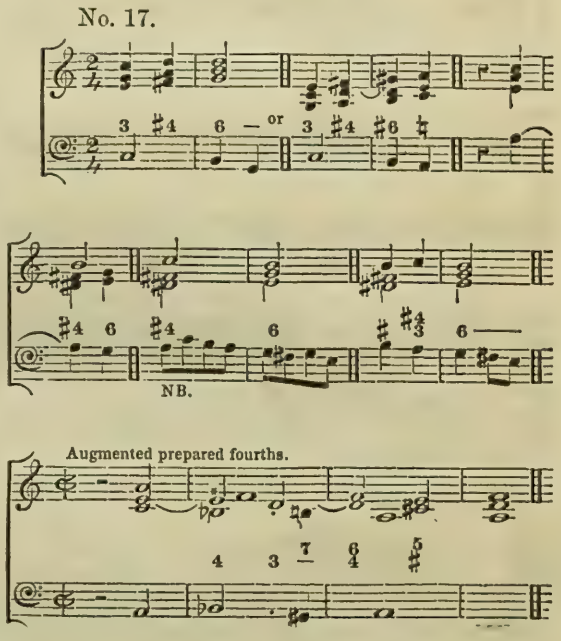
With the perfect fourth is also played the perfect fifth and perfect octave, especially in counterpoint passages; but in free style, the sixth is often taken instead of the fifth. Good authors indicate this sixth by its figure; for example:—

No. 16.



To the augmented fourth, when it is not prepared, belong the major second and major sixth, or in minor keys the minor third instead of the second; this third, however, should be indicated, unless the bass already form a minor third progression; in which case it need not be figured, as it may be known by the progression of the bass, (see example marked NB.). When the augmented fourth is not prepared, it rises a semitone or a whole tone, as the bass descends into a sixth. Should the fourth be prepared, it descends a third, while the bass remains stationary; for example:—

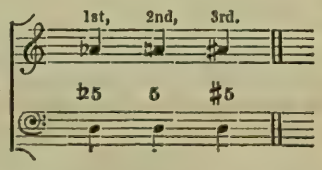
No. 17.



The Fifth.

The fifth is three-fold, namely: diminished, perfect, and augmented, ♭5 or ♮5, 5, ♯5. The first consists of two whole tones and two major semitones; the second of three whole tones and one major semitone. The third of four whole tones:—

No. 18.



To the diminished fifth belong the minor third and minor sixth, when the bass ascends a major semitone; which is the case in all sevenths in major keys. But when the bass makes a progression, which is no passing note, then the fifth is accompanied by the minor third and perfect octave, and

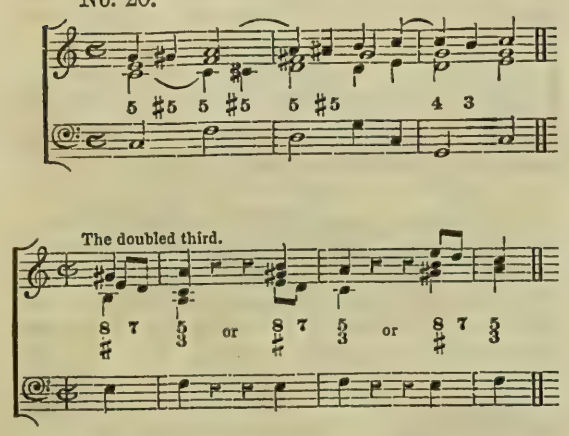
may be used on the second of a minor key, and also on the major seventh of a major key; for example:—

No. 19.



To the perfect and augmented fifth belong the octave and the third; also in certain cases the doubled third. For example:—

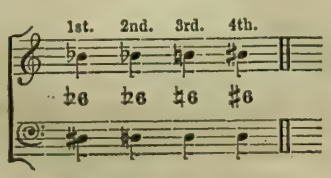
No. 20.



The Sixth.

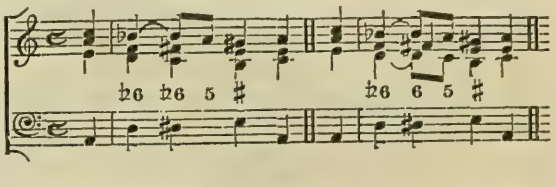
The sixth is fourfold, namely: diminished, minor, major, and augmented, ♭6—, 6, 6♯; for example:—

No. 21.



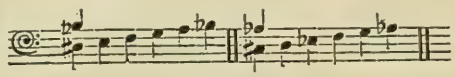
To the diminished sixth, which in general is only a suspension of the imperfect fifth in the chord of the diminished seventh, belong the minor third and the diminished seventh; or instead of this last, the diminished octave, which is again only a suspension of the diminished seventh; for example:—

No. 22.



The diminished sixth consists of three major semitones and two whole tones; for example:—

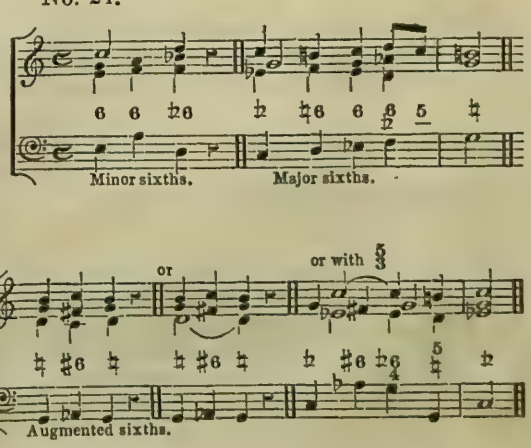
No. 23.



To the minor and major sixth belong the perfect octave and a third according to the scale; but very often the third and the sixth itself may, and must be doubled, when it is not the seventh of a major key.

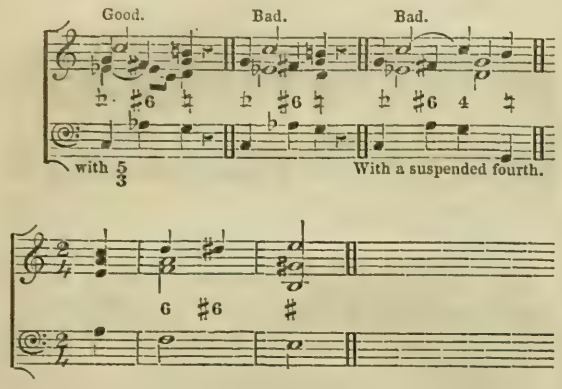
Remark.—When the bass note is the second of the scale, major or minor, it is usual, with a major sixth, to substitute the perfect fourth for the octave and minor third; for instance, above D in C major and minor, $\frac{6}{4}\,\frac{B}{G}\,\frac{}{F}$. The augmented sixth is seldom accompanied by the octave, but often by the doubled major third; or instead of the doubled third, the augmented fourth, or perfect fifth; for example:—

No. 24.



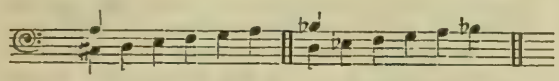
Remark.—When the augmented sixth is followed by a full common chord, or a suspended fourth, with $\frac{5}{3}$, for instance, $\frac{6}{4}\ _3$, it is not advisable to use the fifth, as consecutive fifths would ensue; unless the fifth is made to descend into the third; for example:—

No. 25.



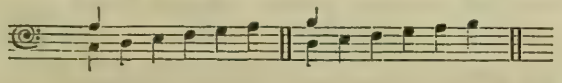
The minor sixth consists of three whole tones and two major semitones. Example:—

No. 26.



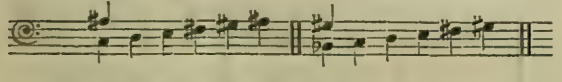
The major sixth consists of four whole tones, and one major semitone. Example:—

No. 27.



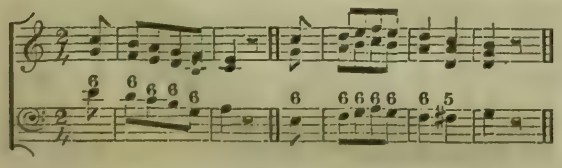
The augmented sixth consists of five whole tones. Example:—

No. 28.



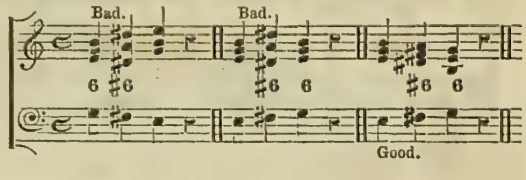
Remark.—When many sixths follow each other, it is usual to play them in three-note chords without the octave, particularly in quick time; for example:—

No. 29.



Remark.—Accidental major sixths, thirds, and tenths must not be doubled (especially in the highest part) when they are the leading note, as is generally the case. Neither may the octave of the fundamental bass be doubled (which may easily occur in a minor sixth chord) as the fundamental note would be an augmented interval. The following are examples:—

No 30. No 31.

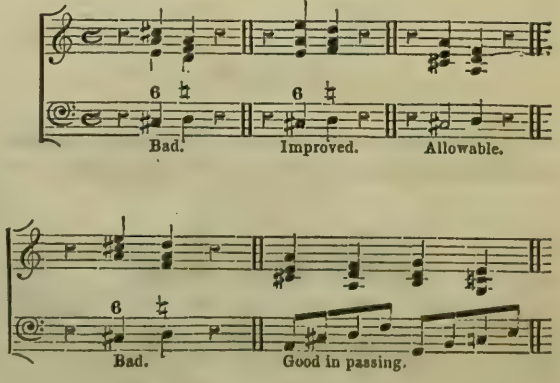


No. 32.



In the above examples, No. 31 shews the second fifth diminished, being in the major sixth chord in the right hand. No. 32 shews the fifth perfect, and therefore erroneous; for a perfect fifth may not follow a diminished fifth, although a diminished fifth may follow a perfect one:—

No. 33.

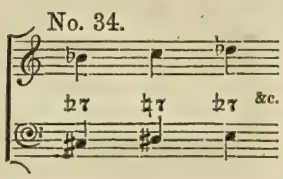


The Seventh.

The seventh is three-fold—diminished, minor, and major: ♭7 or ♮7, 7, ♯7.

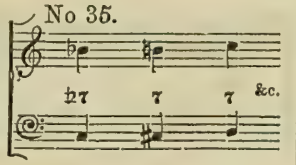
No. 34.

The first consists of three whole tones, and three major semitones. Example:—



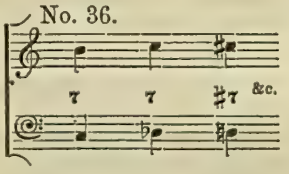
No 35.

The minor seventh consists of four whole tones, and two major semitones. Example:—



No. 36.

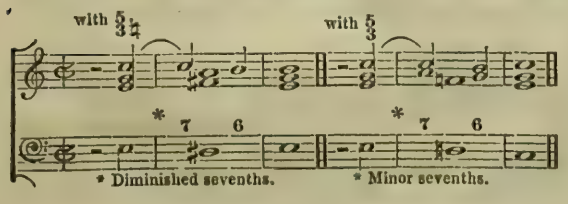
The major seventh consists of five whole tones, and one major semitone. Example:—

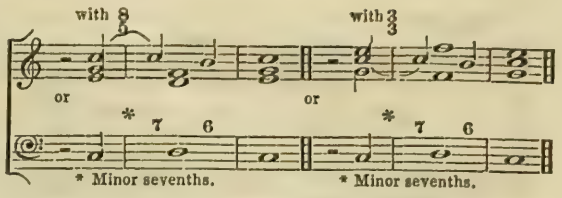


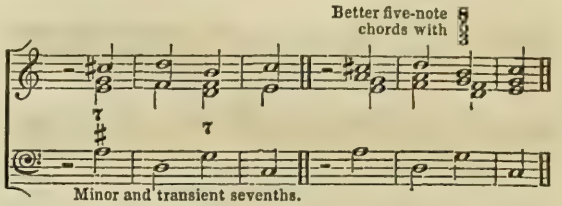
To all three seventns, whether suspensions, passing notes, or unprepared, belong a third and fifth according to the scale; or the perfect octave, instead of the fifth, and a third, or a doubled third.

Remark.—Minor and major thirds, minor and major sixths, perfect fifths, perfect fourths, and major seconds, may all be doubled, when they are not the leading note. The third is usually doubled in a chord of the $\frac{6}{5}$, or 7: the sixth is doubled in a chord of the $\frac{6}{4}$, or 6: the perfect fifth in a chord of the fifth: the perfect fourth in a chord of $\frac{6}{4}$: the major second in a chord of $\frac{5}{2}$. The doubling of intervals is necessary, to avoid consecutive fifths and octaves, as will be seen in the six hazardous progressions (see page 14), and other examples. All three sevenths are prepared in the right hand by suspension, and are resolved by descending a semitone or a whole tone. When a major or minor seventh is not a suspension, it is accompanied with a major second (which is usually figured with it), and the perfect fourth, and is resolved by ascending to the octave, as $\frac{\sharp 7}{2}\,\frac{8}{3}$. See the three examples in D minor:—

No. 37.

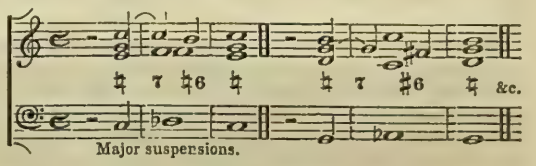


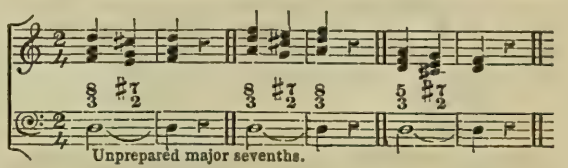


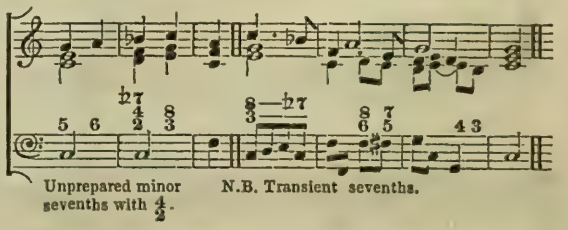


Remark.—The transient seventh, in all keys, is that which occurs on the dominant, or natural fifth note above the key note, with the major third and perfect fifth or octave:—

No. 38.



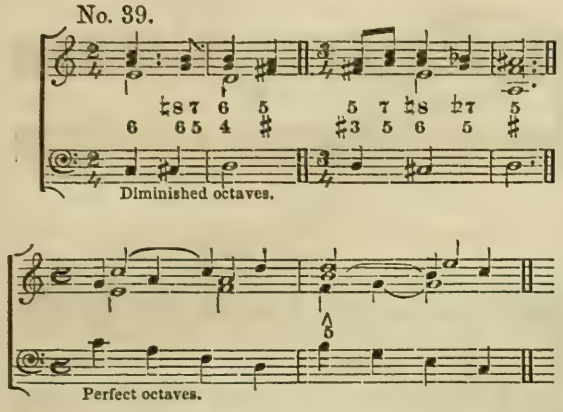




The Octave.

The octave is two-fold, namely: diminished and perfect, ♭8 or ♮8, and 8. Beneath the first is usually figured the minor sixth, to which must be added the minor third in four-note chords. When the perfect octave stands alone, or follows a ninth or a seventh, a third is added in three-note chords, and a third and fifth in four-note chords; for example:—

No. 39.

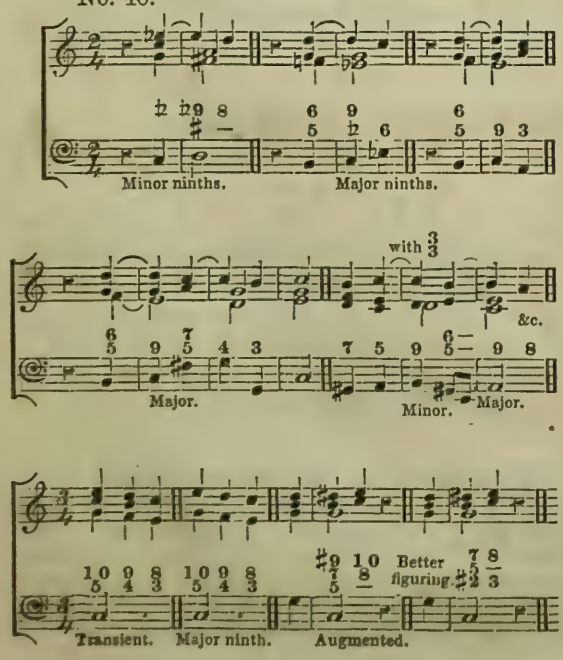


The Ninth.

The ninth is two-fold: minor and major. To both belong a third and a fifth; sometimes the third is doubled instead of the fifth. Both ninths are prepared in the right hand by suspension, and are resolved by descending a whole tone or a semitone.

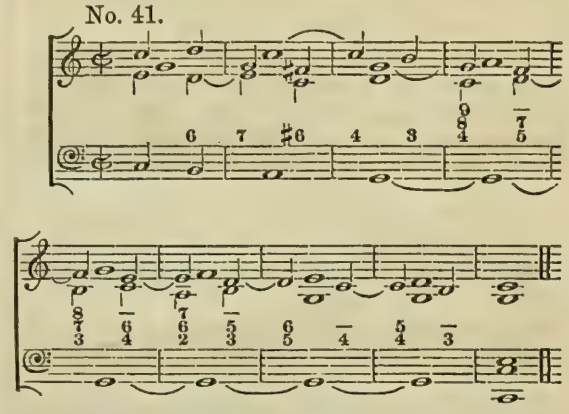
Remark.—The minor ninth is the nearest major semitone above the octave; the major ninth is the nearest whole tone above the octave. When the ninth occurs as a passing note, the major seventh may be taken as a fourth part, unless the whole is played in three-note chords. The student need not fear to use an augmented ♯9 with $\frac{7}{5}$, which is only the augmented second. Some composers make the mistake, also, of marking the augmented octave instead of the augmented unison. The following are some examples:—

No. 40.



Remark.—When the fifth is figured with the sixth, $\frac{6}{5}$; the sixth with the seventh, $\frac{7}{6}$; or the octave with the ninth, $\frac{9}{8}$; which often occurs, especially on pedal notes (*tasto solo*), these consonants sound like dissonants, and require to be resolved by descending; for example:—

No. 41.



Remark.—A pedal note is seldom figured, and is not to be accompanied unless figured.

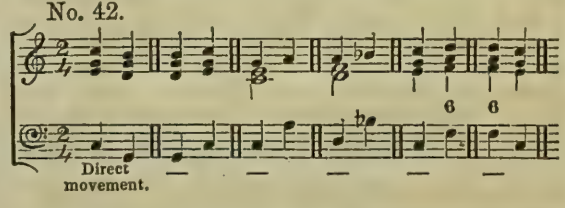
The Tenth.

The tenth is threefold—diminished, minor, and major; and is nothing else than a third above the octave: therefore, all that has been said respecting thirds is applicable to tenths.

IV.

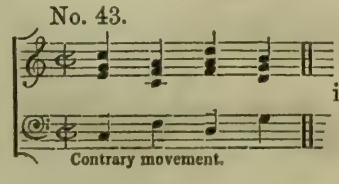
All chords have three movements, namely: direct movement, in which both hands descend or ascend; this is the worst movement, as in it consecutive octaves and fifths are prohibited. The contrary movement, which is better, is produced when one hand ascends and the other descends. The oblique movement is produced when one hand moves, while the other remains stationary, and is the best movement. For example:—

No. 42.

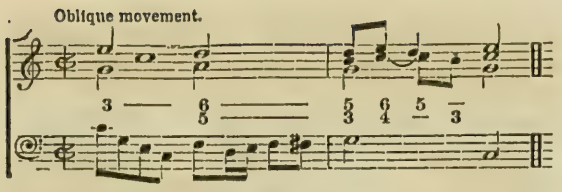


It is good in progressions of the perfect fourth in ascending and descending; and in progressions of minor or major sixths, in ascending only:—

No. 43.

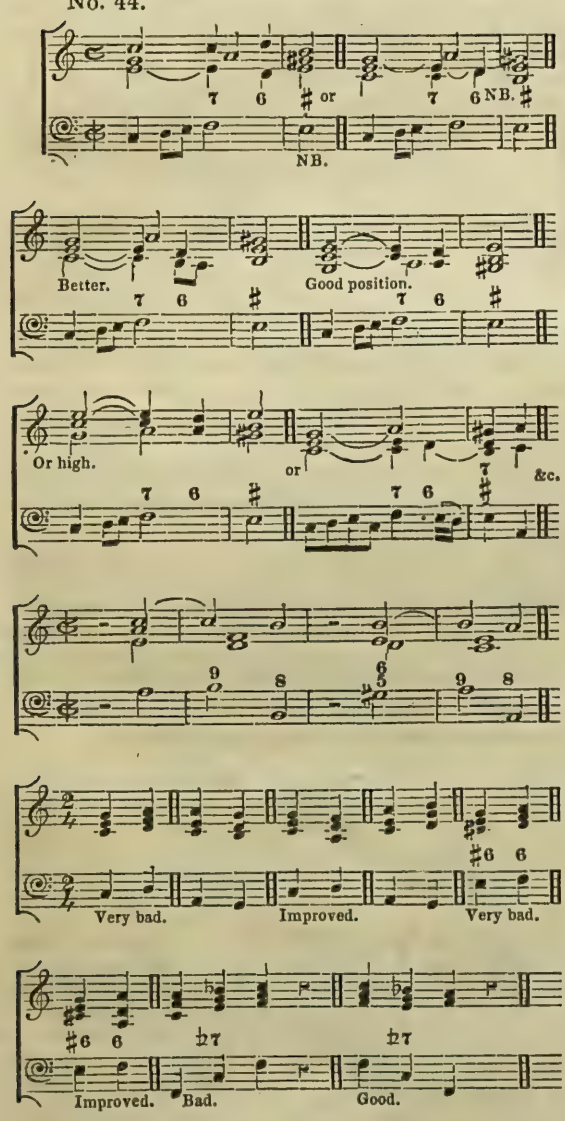


is almost always good.



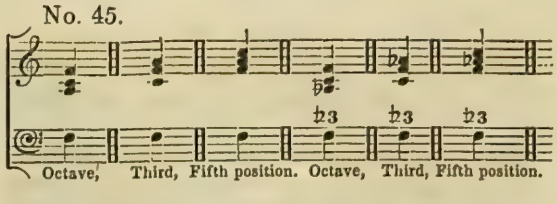
Remark.—In the direct movement it is allowable to use a concealed consecutive fifth or octave, when the upper part progresses a third, or the bass progresses an octave, if a melody or a preparation require it; for example:—

No. 44.



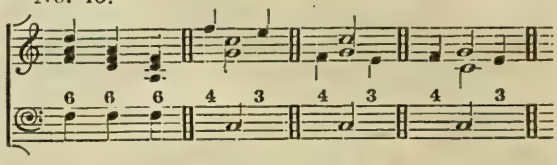
Every chord can be taken in three positions in the right hand alone, excepting in divided harmony, in which each hand takes two parts in a four-note chord, or when the left hand plays three parts, and the right hand only one; for example, above F:—

No. 45.



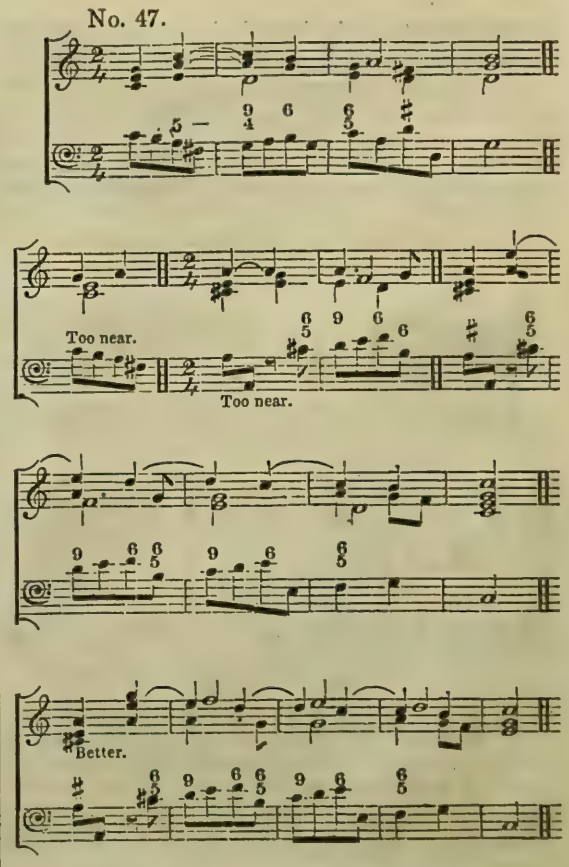
The first three are called F major, the three others F minor chords. The same rule applies to all other full common chords. Imperfect and dissonant chords also may be taken in three positions: the sixth above, beneath, or in the middle; the fourth above, beneath, or in the middle, &c. &c.; for example:—

No. 46.



It is not well, especially in fugue playing, to move the position of the right hand by leaps; but of course it must be changed when the two hands are too near each other, or too far apart; also on a long bass note, or after a pause; for example:—

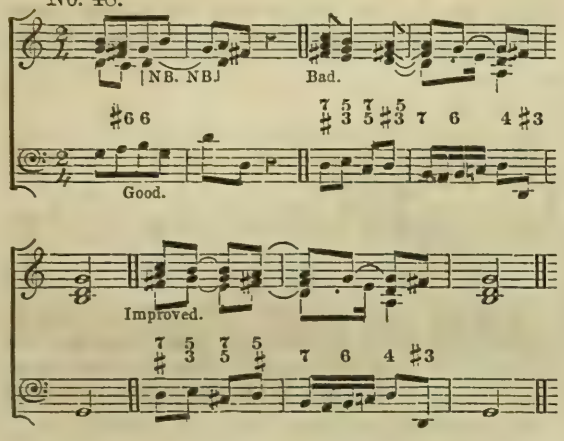
No. 47.



V.

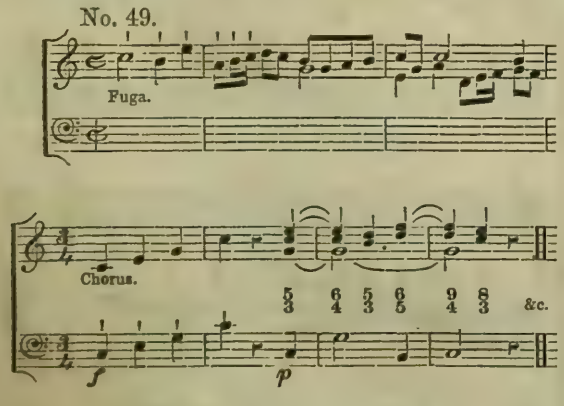
It is not necessary to accompany all fundamental notes by four-note chords, especially when the bass lies high, and takes a tenor character; or when consecutive fifths are to be avoided; in both cases, some of the notes may be accompanied by three-note chords, even when the passage is in four parts; for example:—

No. 48.



When the tenor is figured, three-note chords are played, and the alto is usually accompanied in two parts; but when the following dashes ı ı ı ı are placed over the notes, they are played by one hand without accompaniment, whatever key may be marked. In choruses, tutti-passages, and symphonies (in *forte* or *fortissimo*), notes bearing these ı ı ı ı may be played with octaves in unison; this is not allowed in leading off a fugue; for example:—

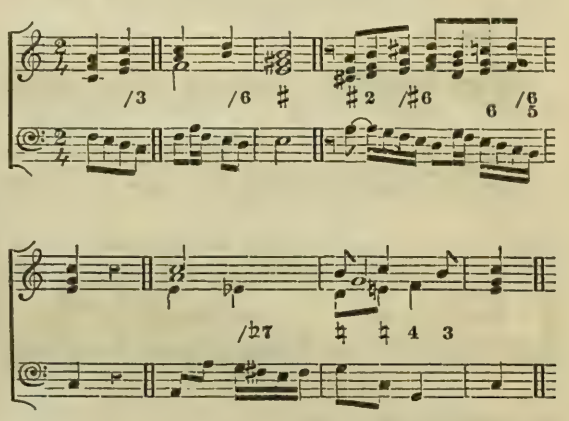
No. 49.



A dash through a figure signifies the same as a sharp, and sometimes a contradicted flat; it therefore makes an interval major or augmented. A flat or a natural (when contradicting a sharp), placed before a figure, makes the interval minor or diminished.

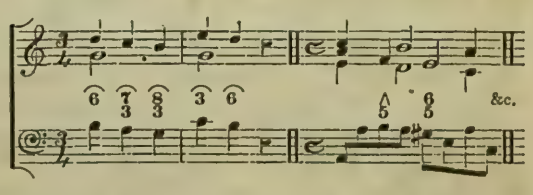
Remark.—Prepared notes are not generally marked by accidentals, as the preparatory notes indicate the change. A straight stroke (—) placed after a figure signifies that the chord, or sometimes a part of it, is to remain in the right hand, until new figures occur, or until the notes under the strokes have ceased. A diagonal stroke inclining upwards from left to right (⁄), signifies that the fundamental note is an irregular passing note, and must be accompanied by the full chord of the note which follows; for example:—

No. 50.

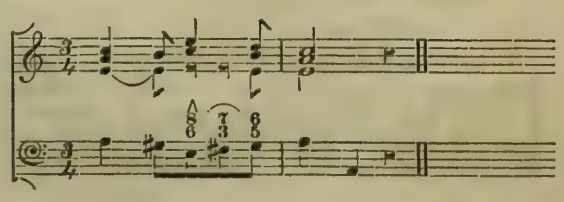


When the following sign (⌒) is placed over one or more figures, the fundamental notes are to be accompanied by three-note chords, as in No. 51. A pointed curve (∧) signifies that the diminished fifth $\hat{5}^{\flat}$, or $\hat{5}^{\natural}$, or $\hat{5}$, is to be played in four parts with a third and octave; as in No. 52. This sign is also placed above $\overset{\wedge}{8}$, when the fundamental note is to be accompanied by a three-note chord, that is, without the third; as in No. 53:—

No. 51. No. 52.



No. 53.



VI.

Before proceeding further, the student must learn by memory all the intervals belonging to the following general, simple, and double figuring; and the teacher should frequently exercise him upon these chords.

Remark.—The line of separation is merely used to divide the implied intervals from the written ones.

In playing three-note chords, the following table shews the implied intervals:—

	1.	2.	3.	4.	♯4.	5.	6.	7.	8.	9.	10.
Implied intervals.	0.	4.	5.	5.	2.	3.	3.	3.	3.	3.	8.
			or		6.		or				or
			8.				8.				5.

In playing four-note chords, the following table shews the implied intervals:—

	1.	2.	3.	4.	♯4.	5.	6.	7.	8.	9.	10.
Implied intervals.	0.	4.	5.	5.	2.	3.	3.	3.	3.	3.	8.
		6.	8.	8.	6.	8.	8.	5.	5.	5.	5.

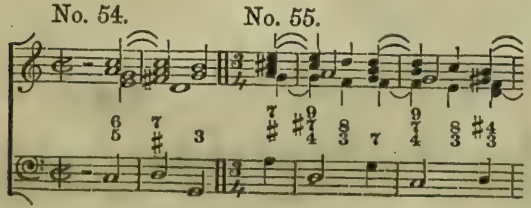
Remark.—When two figures are marked above the fundamental note, the third interval ought to be known by memory, in order to play four-note chords: for example:—

	4.	5.	7.	4.	5.	6.	7.	8.	9.	5.	6.	♭7.	8.	9.
	2.	2.	2.	3.	3.	3.	3.	3.	3.	4.	4.	4.	4.	4.
Implied intervals.	6.	5.	4.	6.	8.	8.	5.	5.	5.	8.	8.	5.	5.	5.
		or			or	3.	8.				or	8.		
		2.			3.	6.	3.				6.			
					or									
					5.									

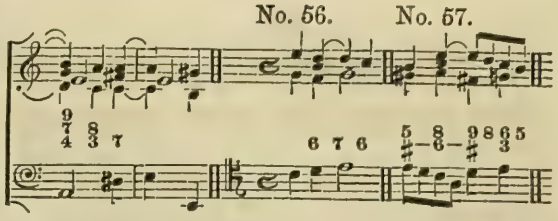
	10.	6.	7.	8.	10.	7.	8.	8.	9.	9.	9.	10.	
	♯4.	5.	5.	♭5.	5.	6.	6.	7.	6.	7.	8.	8.	&c.
	♯6.	3.	3.	♭3.	8.	2.	3.	♯3.	3.	3.	4.	5.	
		or				or							
		6.				3.							

Remark.—In some cases, a chord must be in five parts, in order to prepare the following chord; and for the same reason, some fundamental tenor notes must be accompanied by a four-note chord, as shown in Nos. 54 to 57:—

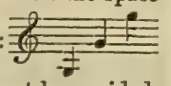
No. 54. No. 55.



No. 56. No. 57.

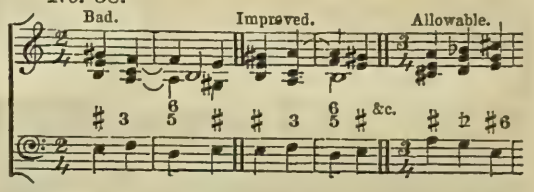


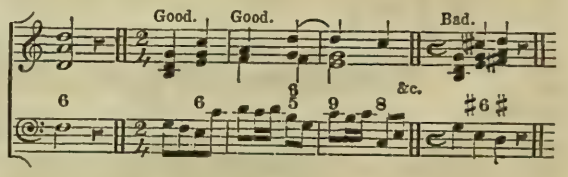
A beginner must also be careful that the two hands be not either too near or too far from each other. The right hand should not exceed the space of these two octaves with their chords:

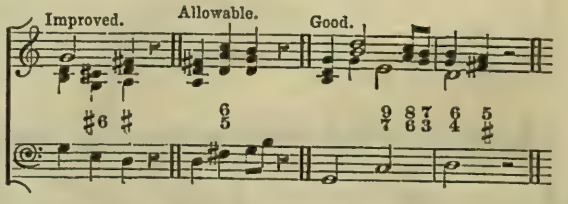


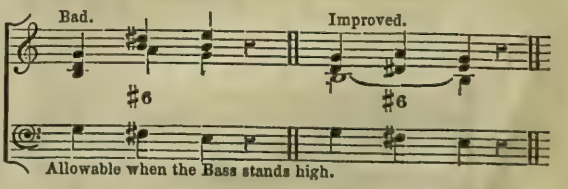
Dissonant and distant progressions must be avoided. In close progressions, the augmented second is bad in descending, but tolerated in ascending; see No. 58:—

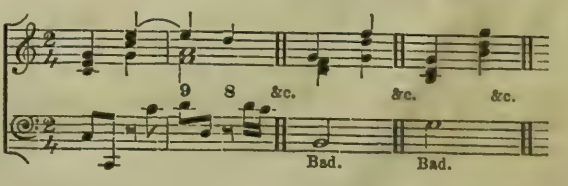
No. 58.











VII.

The Six Hazardous Progressions.

First progression. The second beneath in the right hand :—

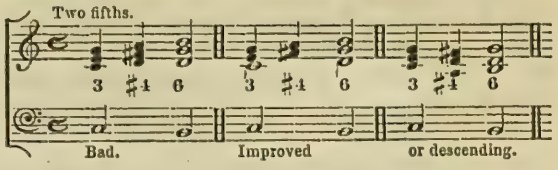
No. 59.



In No. 60, the consecutive fifths are not erroneous, because the latter one (which completes the chord of the second) is diminished ; but the two other positions are preferable.

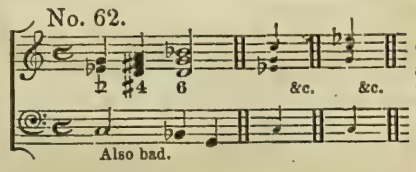
Second progression. The augmented fourth, in the middle part of the right hand :—

No. 61.



The other two positions are good in ascending and descending :—

No. 62.

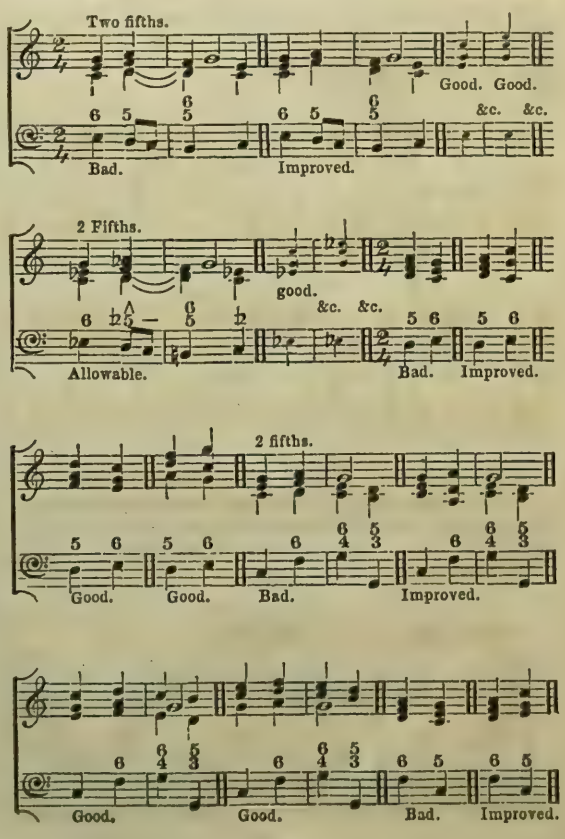


Good, ascending and descending in the chord of the ♯4th.

Third progression. The fifth after the sixth, or the sixth after the fifth.

Remark.—Also in contrary movement.

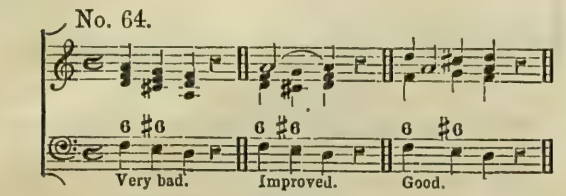
No. 63.

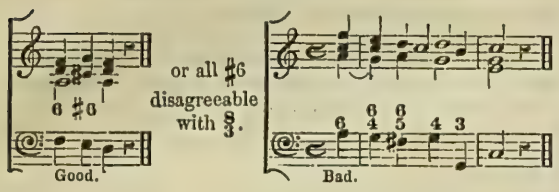




Fourth progression. Two or more sixths in direct movement in both hands :—

No. 64.





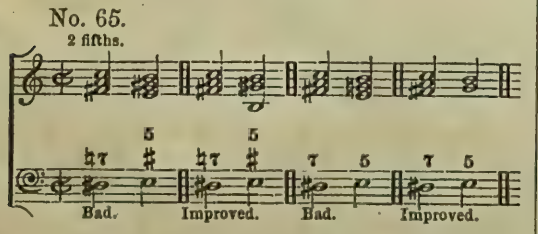




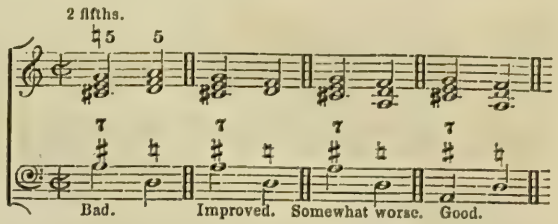


Fifth progression. The three sevenths above, accompanied by the third and fifth :—

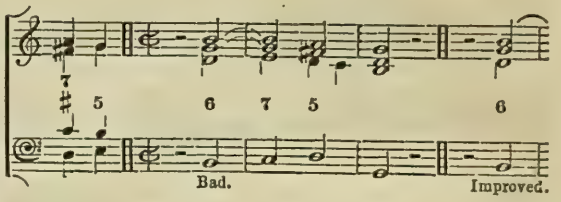
No. 65.

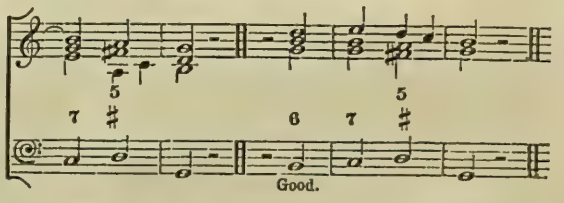


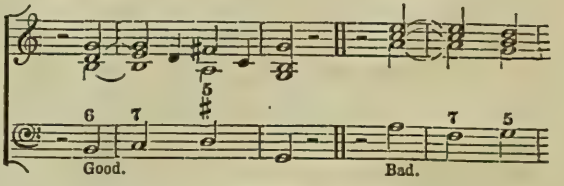
The two other positions are good in descending.

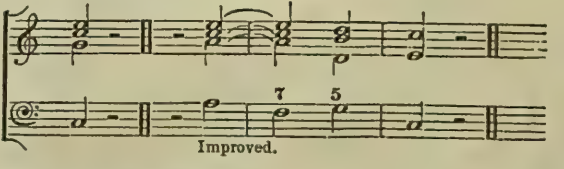








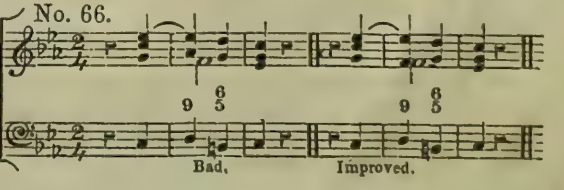




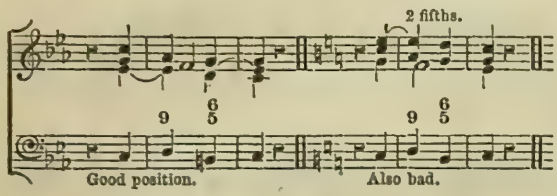
The other positions good.

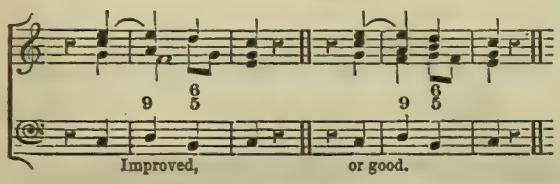
Sixth progression. The two ninths above and in the middle, followed by 8/3, and when the bass descends a third :—

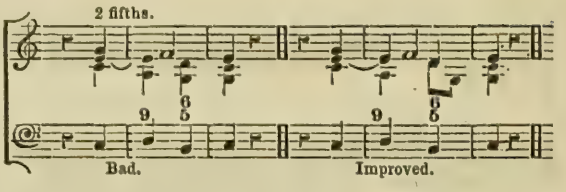
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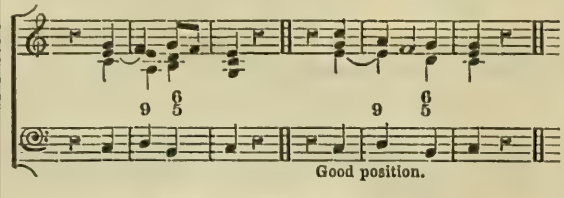












Remark.—In these examples of the ninth, the imperfect fifth is omitted, in minor keys, and the minor third doubled in its place; in major keys, when the ninth is prepared, the fifth may be retained, and the following $\frac{6}{5}$ can be played in succession in rapid notes.

In these hazardous progressions, the fault most easily committed is a consecutive fifth; this great error must be avoided in all keys, by doubling or omitting intervals, or by contrary movement.

THE END.

(342)



THE Compleat Tutor For the GUITTAR,

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INSTRUCTIONS FOR THE GUITAR.

The Manner of Holding the GUITAR.

PLACE it acroſs the Body, with the Neck inclined upwards; then apply the Little Finger of the Right-hand to the End of the Bridge next the firſt or ſmalleſt String, by which the Inſtrument will reſt upon it; the Left-Hand holding the Neck between the Ball of the Thumb and the Root of the Fore-Finger.

The beſt Way to hold it with Eaſe in this Poſition, is to ſling it over the Left-Shoulder, with a Ribbon fixed to both Ends of the Inſtrument, ſo that the Hands, particularly the Left-Hand, may be free to move up and down without Interruption; the Neceſſity of which will be found in the Courſe of Practice.

Of the Right-Hand Fingers.

WHEN the Inſtrument is thus placed, hold up the Wriſt, ſo as it may, together with the Fingers, form a Roundneſs; then ſtreight the Fore-Finger, and draw it acroſs all the Strings, beginning at the ſmalleſt: In like Manner, return the Thumb, from the Thickeſt, by which the Poſition of the Fingers will be diſcovered.

The true *Fort* of the Inſtrument is beſt produced by touching the Strings between the Bridge and the Sound-hole; though it will occaſion a

pleaſing

pleaſing Variety, to play ſometimes near the Bridge, and afterwards a far up as the little Finger will allow the others to reach; the Tone of th one repreſenting the Lute, and the other the Pipe or Organ. But this i only to be attempted when the Learner is well advanced, and can wit Judgment apply it, ſo as to expect a good Effect from it.

The running the Thumb and Fore-Finger acroſs the Strings, as above is recommended as a Leſſon ſufficient for the firſt Day; only the Thumb to leave one String for the Fore-Finger to begin with, and ſo of the Fore Finger and Thumb; taking Care that theſe two Fingers are never ſepa rate, and that they move up and down upon one another, ſo as the on may not interrupt the Performance of the other. After this Manner ar all *Arppeggio's* performed; an Example of which may be ſeen in th ſecond Prelude.

Hitherto two Fingers, *viz.* the Thumb and Fore-Finger, have only been recommended for Uſe; tho' in the Courſe of this Performance, it will be ſhewn, that four are requiſite. There are ſome that only recommend theſe two for all. But this renders even eaſy Paſſages difficult, and muſt often marr the Performance, as it is impoſſible to move the Fore-Finger (which by this Method muſt execute the whole, except ſome occaſional low Notes) ſo quick as moſt Muſic will require, without ſometimes touching the wrong Strings: Nor is there any Reaſon why a Finger that naturally hangs over a String ſhould be idle, and another come from a Diſtance to perform its Office: On the contrary, had we a Finger for each String, it would facilitate our Performance; but this not being the Caſe, we muſt loſe the Uſe of none of thoſe we have.

Example 1. in Plate firſt, ſhews the Notes repreſenting the open Strings, and are called by the Letters under them.

Example 2. ſhews a different Method of fingering the open Notes from that formerly given.

N. B. 0, 1, 2, 3 } means the { Thumb. Fore Finger. Second Finger. Third Finger.

In this Example, the firſt three Notes are played by the Thumb, which muſt not be lifted at each, but made to ſlide over them. The next three have a Finger to each; and as the Strings are * double, Care muſt be taken that they are ſtruck ſo as to make them vibrate equally. In returning theſe Notes, the Fingers are the ſame; only the laſt three, which, inſtead

* Such Strings as are cloſe to each other are Uniſons, or the ſame Sound, and therefore conſidered only as one Note.

inſtead of the Thumb, are played by drawing the Fore-Finger over them. To perform this quickly, is Work ſufficient for the ſecond Day.

Example 3. is another Leſſon on the open Strings, which merits another Day's Practice.

Nor is Example 4. leſs deſerving, as it is deſigned to exerciſe the Fingers for double, treple, and quadruple Notes. In playing this Leſſon, the Fingers muſt be preſſed equally on the Strings, and then drawn in towards the Body, (the Thumb the reverſe) at the ſame Time viewing the Strings on the Finger-board, to diſcover if their Vibrations are equal, which, if otherwiſe, is a Sign they have not been equally preſſed.

Though theſe Examples are but ſhort, yet, by repeating them, which is here deſigned, they may be lengthened at Pleaſure; taking Care that no more Time be loſt between the firſt and laſt Notes, than between any two lying next each other. Each Parcel of Notes between the Croſs-bars in Example 4. may be conſidered as a diſtinct Leſſon, and repeated as above. Such Notes as have not the Fingers marked, are to be played with thoſe applied to the former Notes.

The anxious Learner will no doubt think it unreaſonable to be ſo long detained without a Tune; but let ſuch be aſſured, that beginning to learn any Inſtrument with Tunes, particularly known ones, is generally the greateſt Hindrance they can meet with; for their Eagerneſs to learn theſe Tunes, makes them break thro' every Rule and Method the induſtrious Teacher has been labouring to communicate; whereas, if the Learner would have a little Patience, and firſt endeavour to have a good Notion of the firſt Principles, together with a tolerable Command of the Fingers, his Progreſs would be ſure and ſpeedy. Which, if otherwiſe, ſeldom fails of being ſlow and uncertain, attended with Aukwardneſs.

Of the Left-Hand Fingers.

THEIR Buſineſs is to apply the Strings to the Frets or Braſs-bars acroſs the Finger-board, ſo as to produce a good Tone; and this is beſt done by preſſing the Finger on the String a little above the Fret from which the Tone is received; each of theſe Frets is in Reality a Bridge, which, if the String is made to reſt firmly upon, muſt undoubtedly give a Sound little inferior to the open Note.

Of the Scale.

THE Learner being, it is hoped, by this Time well acquainted with the Lines and Spaces on which the open Notes are placed, will have little Difficulty in remembering the others. Each Note of the Scale (5) has the proper Finger of the Left-Hand marked above it. The Right-Hand Fingers may be applied as at (2).

In playing up the Scale, the Fingers often ſlip a Space between the Frets; the Reaſon of which will be hereafter given. All that the Learner has at preſent to obſerve is, to play the Notes as directed in the Scale and Plan of the Finger-board (6); the one pointing out the proper Finger, the other where to place it.

Example, The firſt Note C, is the ſixth String open. The ſecond being D, is the ſecond Finger on the ſame String, placed on the Inſtrument, as repreſented by Letter D in the Plan; and ſo of all the other ſtopped Notes.

Of Notes, their Names and Proportion.

THE Notes made uſe of in either Vocal or Inſtrumental Muſic, are of ſix Sorts, namely, *Semibreve*, *Minim*, *Crotchet*, *Quaver*, *Semiquaver*, and *Demiſemiquaver*. As to their Lengths and Proportions, a *Semibreve* is equal to two *Minims*, four *Crotchets*, &c. See (7).

Of Reſts.

THESE are Characters which denote Silence, or an Intermiſſion of Sound, and are the ſame, as to Meaſure of Time, with the Notes after which they are placed. They are likewiſe called by the ſame Names, as *Semibreve-reſt*, *Minim-reſt*, *Crotchet-reſt*, &c.

Of a Dot, or Point.

A *Dot* or *Point*, placed after any Note, makes that Note longer by a Half than it formerly was. For Inſtance, a *Semibreve* alone is equal to two *Minims*, but by a *Dot* after it, is made equal to three; a *Minim*, again, is equal to two *Crotchets*, but with a *Dot* is equal to three. And ſo of the others (8).

Of Cliffs.

THERE is one or other of them ſet at the Beginning of every Tune. The G, or Treble *Cliff*, is the only one uſed for this Inſtrument.

Of Bars.

THERE are Lines which croſs the five Lines, which, together with the Spaces betwixt them, are called *Bars*. Of theſe there are two Kinds, namely, ſingle and double: The ſingle *Bars* ſerve to divide the Tune, according to its Meaſures. The double *Bars* ſerve to divide every Strain of a Tune.

There is an Arch or Semicircle, with a *Dot* within it, placed over the firſt double *Bar*, in the Example of *Bars*; this Character is called a *Cloſe*,

and

and ſometimes ſerves to ſhew, that whatever Note it is placed over, is the laſt Note of the Piece; at other Times it denotes, that the Note over which it is placed, may be lengthened at Pleaſure.

There is another Character placed over the ſecond double *Bar*, called a *Repeat*, which ſhews that the Muſic is to be performed over again, from the Note over which it is placed; and *Dots*, being placed by the double *Bar*, ſerve the ſame Purpoſe. The other Character, at the End of the five Lines, reſembling a *W*, is called a *Direct*, and is placed at the End, in order to ſhew on what Line or Space the firſt Note, in the next Line of Muſic, is placed.

Of Time.

THE Characters which denote *Time* are always at the Beginning of a Piece of Muſic; and though they are many in Number, yet there are but two Sorts of *Time*, namely, *Common Time*, and *Triple Time*.

The firſt of theſe, *Common Time* Characters, denote the Muſic to be ſlow, and ſhew there is a *Semibreve*, or as many other Notes or Reſts as are equal to its Length, in a Bar.

The ſecond denotes the Muſic being quick, and anſwers for either one or two *Semibreves* in a Bar.

Triple Time is known by having either $\frac{3}{2}$, $\frac{3}{4}$, $\frac{3}{8}$, *&c.* at the Beginning of the Tune; the firſt of theſe ſhews that there are three *Minims* in a Bar, and is the ſloweſt of all Triple Times. The ſecond, $\frac{3}{4}$, ſhews, that there are three *Crotchets* in a Bar, and is generally quicker than the former; but that theſe and all other Kinds of Time may be rightly underſtood, let it be obſerved, that the *Semibreve* is the Source of all Times; for the undermoſt Figure being either 2, 4, or 8, ſignifies *Minims*, *Crotchets*, or *Quavers*, contained in a *Semibreve*; and the Figure above theſe ſhews how many of either of theſe is in a Bar. As for Inſtance, if $\frac{3}{2}$ is placed before a Piece of Muſic, the Figure below tells the Number of Parts into which the *Semibreve* is divided, namely *two*, which ſignifies *Minims*; for there are no other Notes, whereof two are equal to a *Semibreve*: Then the Figure 3 above ſhews, that there are three of theſe *Minims* in a Bar; and ſo of the reſt.

Of Sharps, Flats, and Naturals.

IT muſt be obſerved, that the Space betwixt each Fret on the Finger-board, is only a half Tone or Note; if a *Sharp* therefore is placed before a Note, it makes that Note a half Tone ſharper, or more acute than it formerly was. A *Flat* has the contrary Effect, as it takes away a half Note from any Note before which it is placed, to make it more flat or grave. Either are performed by placing a different Finger on the Space

above

above or below that formerly uſed. As for Inſtance, ſuppoſe a *Sharp* placed before *D*, the ſecond Note in the Scale, then it is played by putting down the Third Finger in the Space above, as repreſented by the *Sharp* in the Plan; on the contrary, were it a *Flat*, the firſt Finger muſt be put down where the *Flat* is marked. If either of them is ſet at the Beginning of a Piece of Muſic, they affect the Notes on ſuch Lines or Spaces throughout the whole Tune, according to their different Natures.

A *Natural* ſerves to contradict *Sharp* or *Flats*, by reſtoring any Note before which it is placed, to its former natural Sound.

Of a Shake.

THIS ſeems to be the only Deficiency of the Inſtrument; for, in every other Reſpect, it doubtleſs has the Advantage of moſt others of its Compaſs, as it is capable of adding the full Harmony to any Note the Performer chuſes; which, together with its Melodiouſneſs, renders it a moſt elegant Accompanier of the human Voice; nor need it be doubted, but Time will remove this Defect, and likewiſe diſcover more Beauties in the Inſtrument than there are yet known, as it has but lately been introduced in *Britain*.

One Method of a *Shake* is, by ſounding the Note above, and then moving the Finger of that Note as on the Violin; but as the Vibration, occaſioned by ſounding the Note ſoon ceaſes, the Effect is next to nothing.

The next is the ſame with the former, only with this Difference, that inſtead of moving the Finger up and down perpendicularly, it muſt, in falling and riſing, form an oval, by which it will draw the String a little to a Side, ſo as to renew the Vibration. This has a very good Effect, if done with Judgment.

The laſt is that uſed by the Harper, namely, by the Thumb and Fore-Finger on two different Strings. As for Inſtance, ſuppoſe a *Shake* is wanted on *D*, on the fourth Line, then it is performed by the Thumb and Fore-Finger of the Right-Hand, ſounding that Note alternately with the open String above. If this Method is once acquired, it muſt be equal to a *Shake* on any other Inſtrument.

Of a Beat.

THIS is beſt done by the ſecond Method laid down for a *Shake*, only with this Difference, that, inſtead of the Note above, the Finger that ſtops the Note moves; which, when done, muſt be kept down, that the Note itſelf may be the laſt heard. See the Examples.

Of

Of a Slur.

A *Slur* on this Inſtrument ſignifies no more than to point out ſuch Notes as are played by drawing the ſame Finger over them, except in the Songs, where they likewiſe ſhew ſuch Notes as are ſung to one Syllable.

The Learner may now proceed to play ſome Tunes, after which it will be neceſſary to obſerve the following Rules:

I. The Right-Hand may play the open Notes in ſuch Muſic as deſcend, which is done by drawing the String to a Side, in raiſing the Finger from the Note above. See (9) where ſuch Notes as may be played in this Manner have *Dots* above them, as have alſo thoſe in the Leſſon in Page 26. But Care muſt be taken, that theſe Notes thus played be not ſtronger than the others, otherwiſe they will have a bad Effect.

II. In the Scale, the ſecond, third, fifth, and ſixth Strings, have only two Notes each, the fourth has three, and the firſt eight. But it is evident, by viewing the Frets, that each String muſt have the ſame Number of Notes as the firſt; and tho' the Odds over theſe in the Scale, are no more than a Repetition of thoſe on the Strings above, yet the Knowledge of them is moſt neceſſary, there being many Paſſages that cannot otherwiſe be performed. See the third Chord at (10) where the *G* muſt be taken on the ſecond String.

N. B. The proper Figures are marked to this Chord.

At (11) is another Inſtance where *G* muſt be taken on the fifth String.

The eaſieſt Method of playing thoſe at (12,) (which is the ſame with the Tenth Bar of the ſecond Prelude) is by placing the firſt or ſecond Finger acroſs all the Strings, ſo as to make them bear upon the fifth Fret. After this Manner may any common Chord be played, as every Fret is one or other of them.

Of Tuning the GUITAR.

THIS is to be done only by an adjuſted Ear, and therefore is not to be attempted by thoſe who are unacquainted with Muſic. But as there is ſcarce a Place deſtitute of one that can tune a Violin, any ſuch may eaſily tune a GUITAR. The Method is this: Let the third String or Strings * be tuned the ſame Sound with the third Finger on the fourth String of the Violin, which is *C*. This done, the ſecond String is made to ſound the ſame with the firſt Finger on the third String of the Violin, which is *E*, and is third to the former. Then tune the firſt String to the third Finger on the ſame Violin String, being *G*, by which it becomes a fifth

to

* See the Note at the Foot of Page 2.

to the String firſt tuned. When theſe three are thus tuned, they will ſound theſe three Notes at (13).

As a Proof of what has been done, compare ſuch Notes as are croſſed (ſee the *Plan)* with the open Strings above, and if they have the ſame Sound, the Inſtrument is ſo far tuned. As for Inſtance, let the Note that is croſſed on the ſecond String have the ſame Sound with the firſt String open, and ſo of the third and ſecond String.

The other three Strings are no more than Returns of the ſame Sound, they being eight Notes lower than the former; *viz.* the fourth is tuned an Octave to the firſt; the fifth to the ſecond; and the ſixth to the third. If the firſt and laſt three Strings ſound the firſt three Notes in the State-Holders Minuet properly, it is a Sign the Inſtrument is in Tune. And ſuch as cannot tune it, ought to play this Minuet often, as the Knowledge of it will greatly forward their Tuning.

Remarks on the Pitch of the GUITAR.

THE Notes appearing ſo high, makes it ſeem impoſſible for the human Voice to accompany this Inſtrument; but when it is conſidered, that the Muſic is ſet an Octave above it, to prevent too many Leiger-lines, or unaccuſtomed Cliffs, the Difficulty will be removed. The true State of the open Notes are theſe at (14), of which three are Baſs, and therefore improper for a Treble Voice. Thoſe who tranſpoſe for this Inſtrument, muſt obſerve, that the proper Compaſs on it for the Generality of Voices, if pitched at *C*, (which ſeems to be the moſt proper Pitch for the moſt of the Guitars that have yet appeared) are thoſe Notes at (15) which are Uniſon, or the ſame Sound on this Inſtrument, with theſe below them, on either Violin or Harpſichord.

Thoſe at (16) is another Range of Notes which may likewiſe terminate the Bounds of a Song; they being the ſame with the former, only an Octave lower, as may be ſeen by the Notes below them, with which they are Uniſon. If a Song is ſet in this Compaſs (ſee the *Buſh aboon Traquair)* a Treble Voice will naturally ſing an Octave above the Inſtrument, which though not quite ſo proper, yet has no worſe Effect than if a Man and a Woman ſung an Air together. But the former at (15) is doubtleſs preferable, were it not the frequent Shifting of the Hand it occaſions, as it is Uniſon with the Treble Voice, (of which the Fair-Sex are only poſſeſſed,) and likewiſe permits the Inſtrument to join a Baſs or Thorough Baſs.

Theſe GUITARS that have moving Bridges on the Neck, have the Advantage of the others; as by ſuch, the Inſtrument is enabled to ſuit the Voice with any Pitch of Song.

F I N I S.

(1) 6.th or thickeſt String. 5.th String. 4.th String. 3.d String. 2.d String. 1.ſt String.

C E G C E G

(5) 6.th String 5.th String 4.th String 3.d String 2.d String 1.ſt String

C D E F G A B C D E F G A B C D E F G

(6)

(7) 1 Semibreve — Reſts

is equal to 2 Minums

or 4 Crochets

or 8 Quavers

or 16 Semiquavers

or 32 Demiſemiquavers

(8)

The G or Treble Cliff. Bars

Common Time C ¢ 2/4

Triple Time 3/2 3/4 3/8 9/4 9/8 6/4 6/8 12/8

A Sharp ♯. A Flat ♭. A Natural ♮.

Shake Beat Slur

Example Ex

(9)

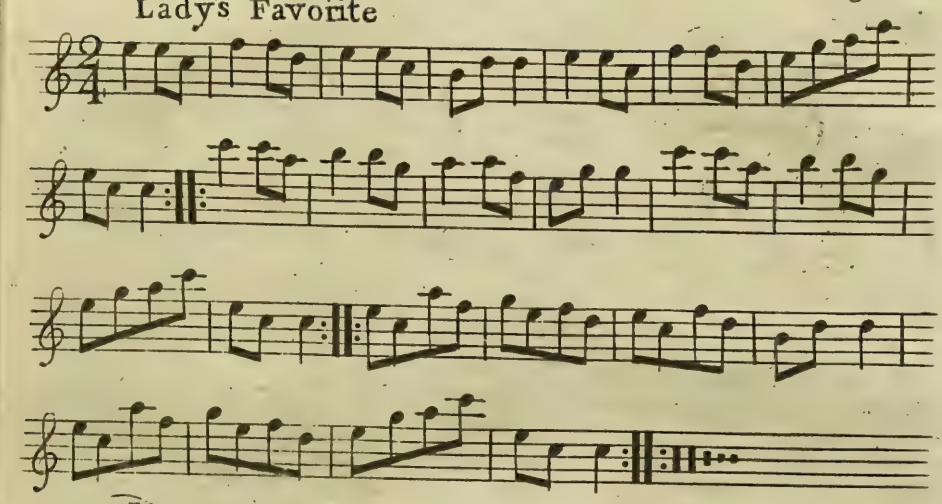
(10) (11) (12)

(14)

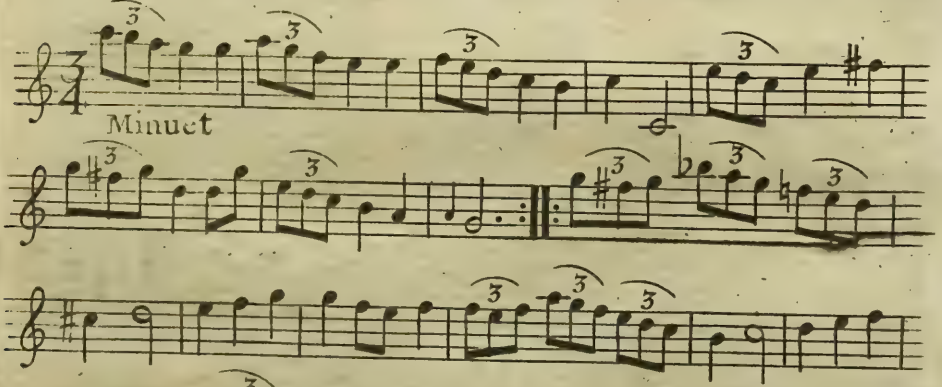
(15)

(16)

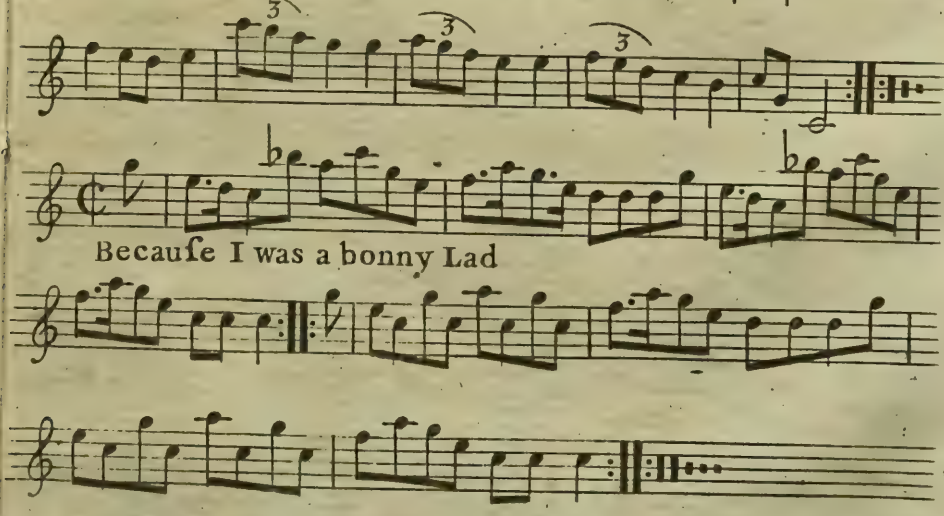
Lady's Favorite



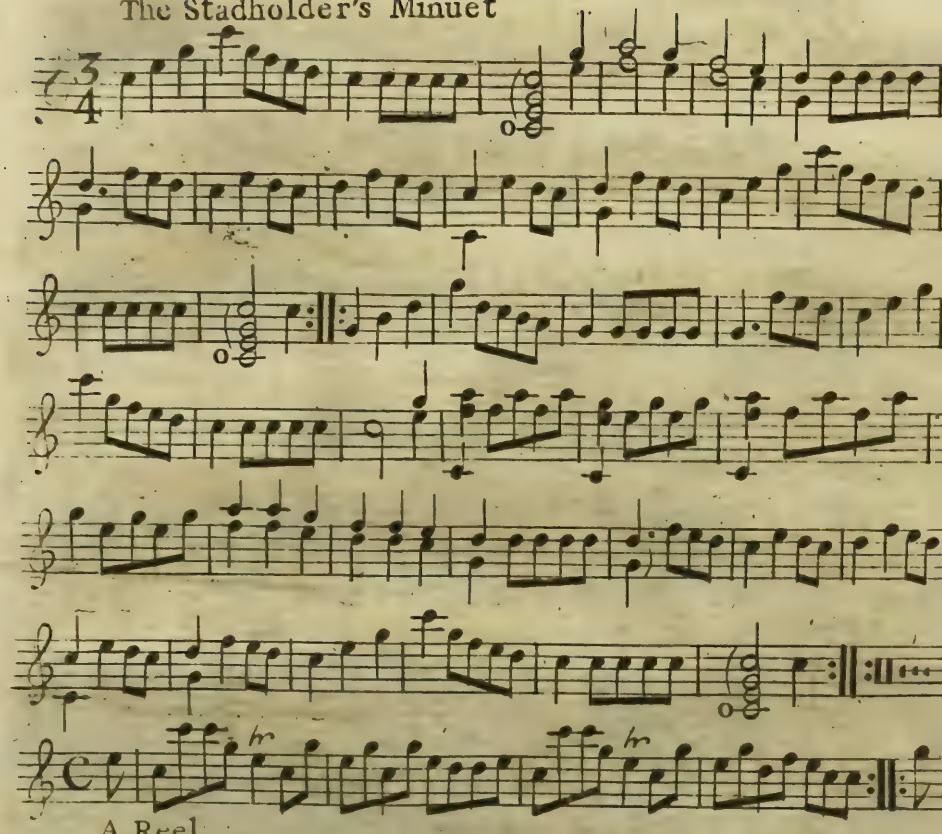
Minuet



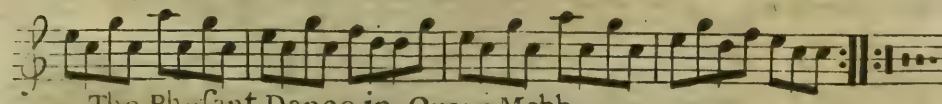
Becauſe I was a bonny Lad



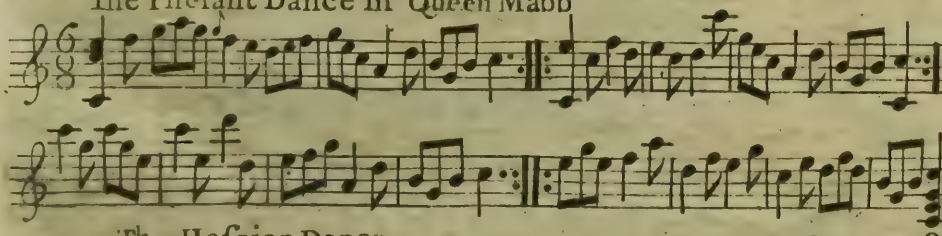
The Stadholder's Minuet



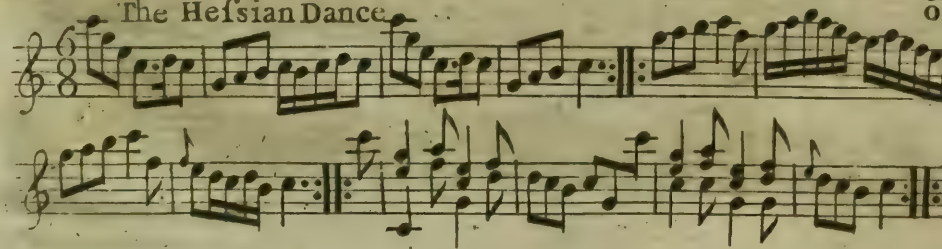
A Reel



The Pheſant Dance in Queen Mabb

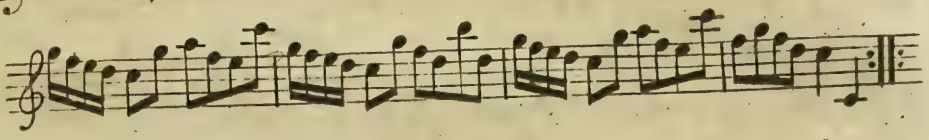


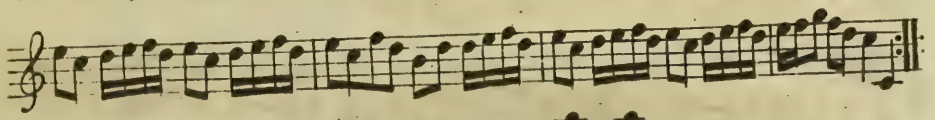
The Heſsian Dance

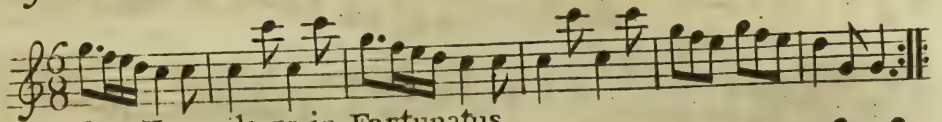


Lucys Delight

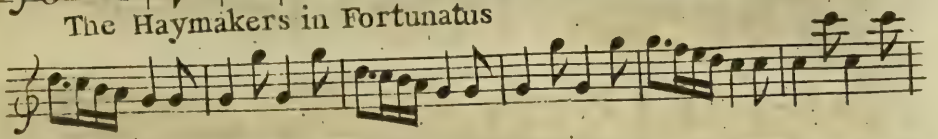






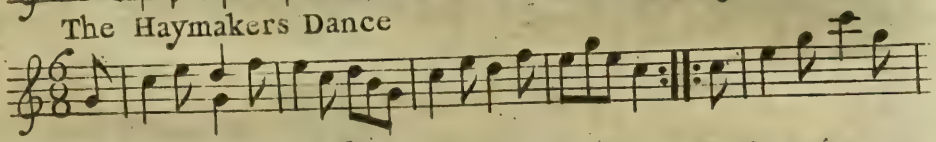


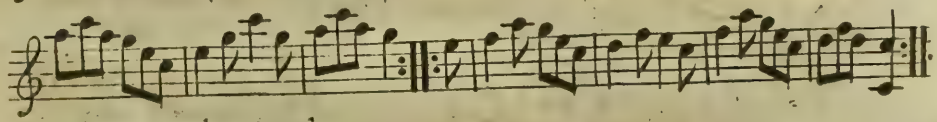
The Haymakers in Fortunatus



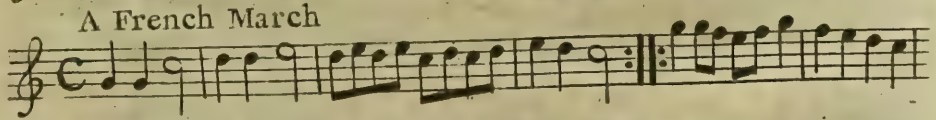


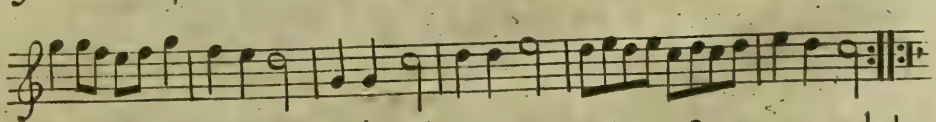
The Haymakers Dance



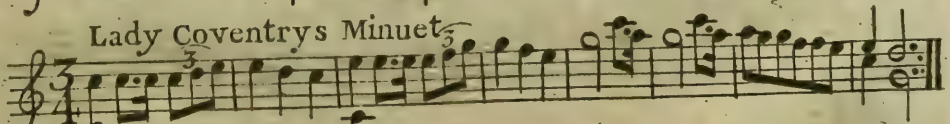


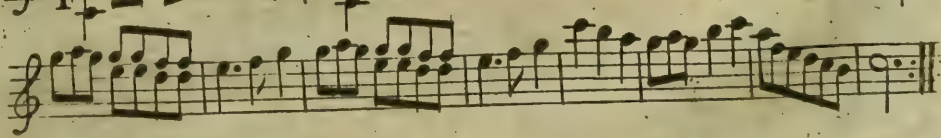
A French March



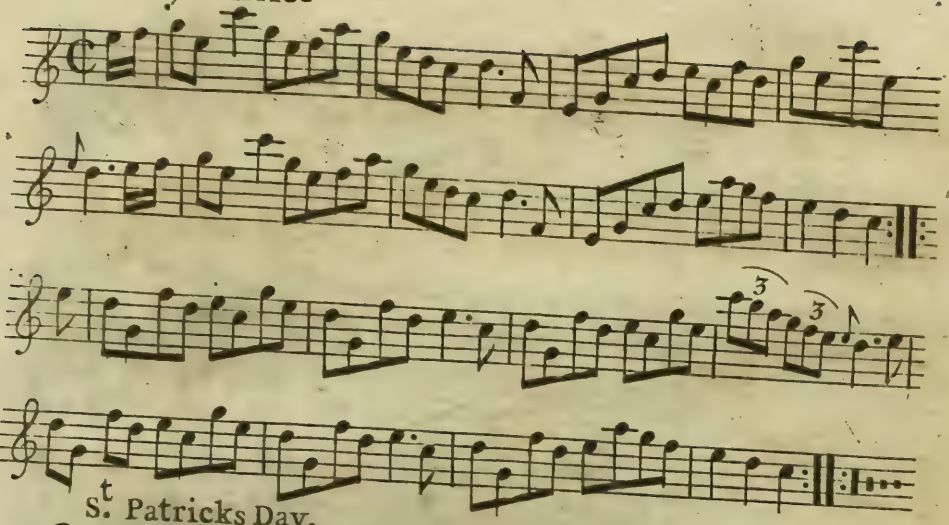


Lady Coventrys Minuet

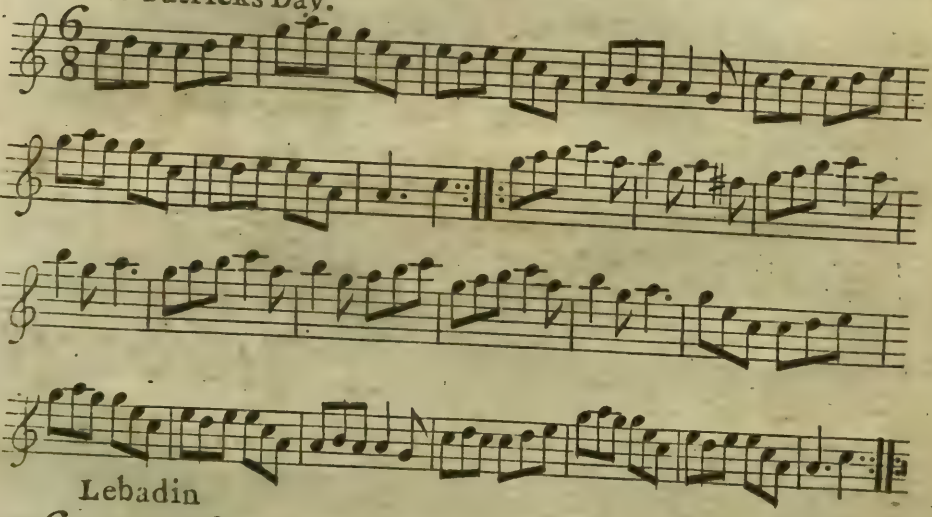




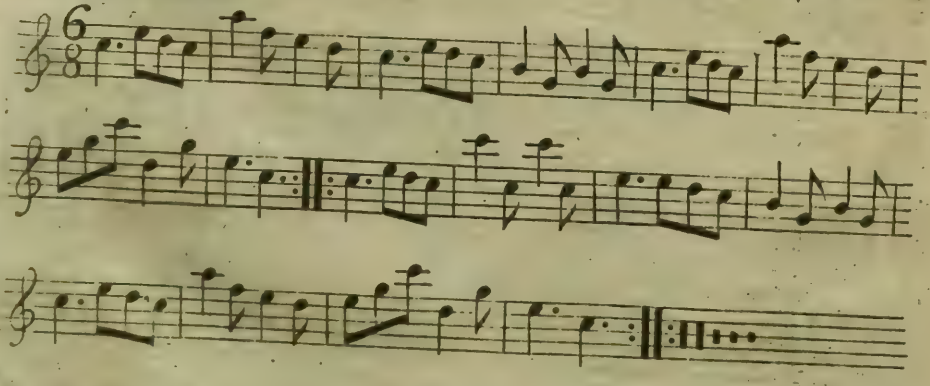
Nannys Choice



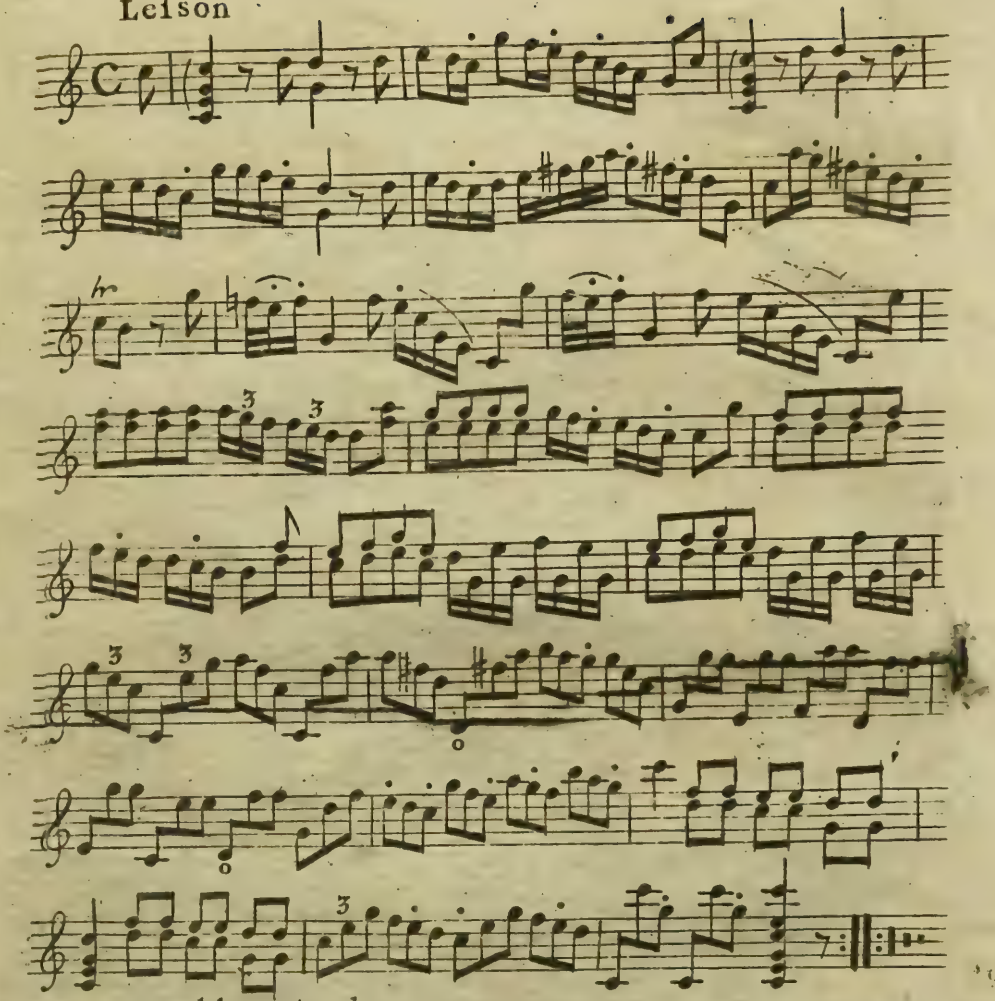
S.t Patricks Day.



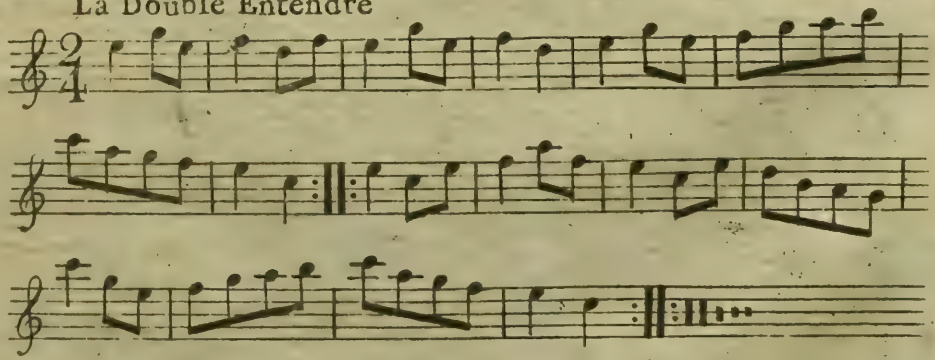
Lebadin



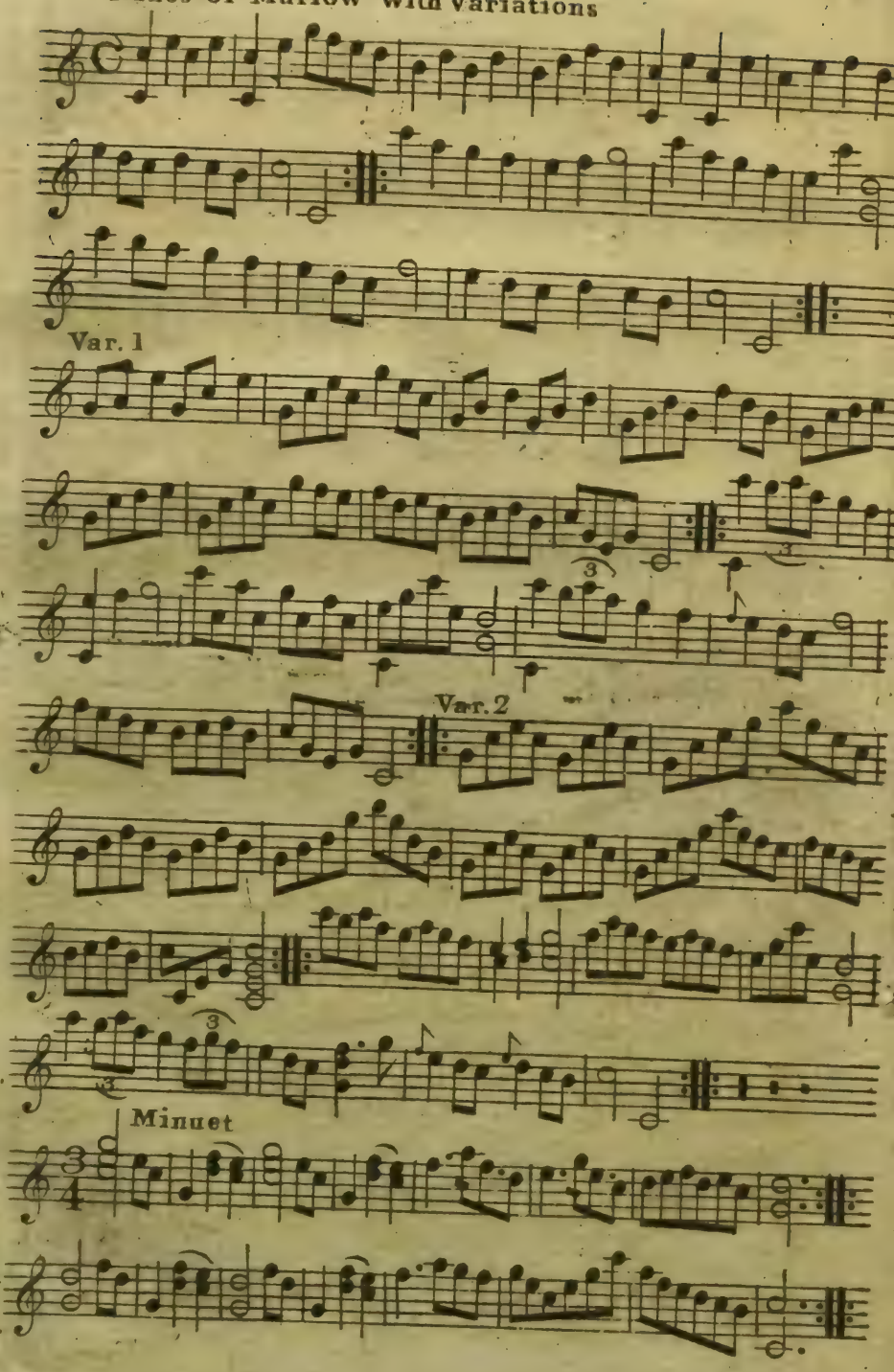
Lefson

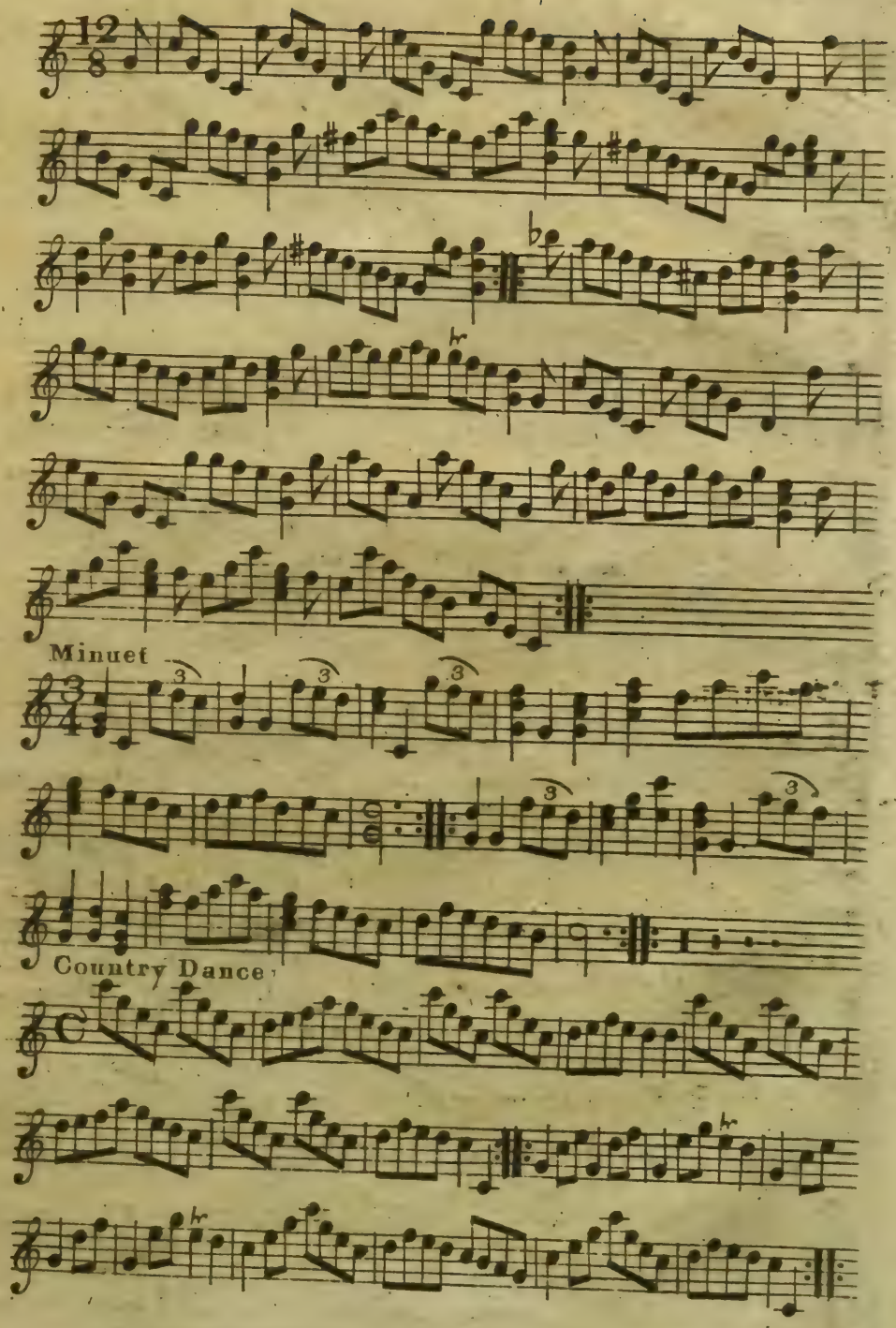


La Double Entendre



Rakes of Marlow with Variations

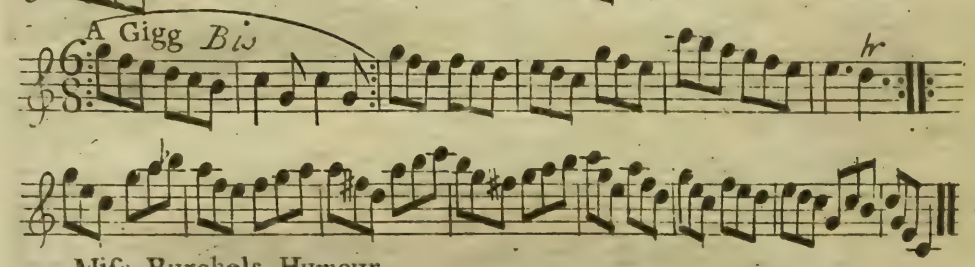



12/8
Minuet
3/4
Country Dance

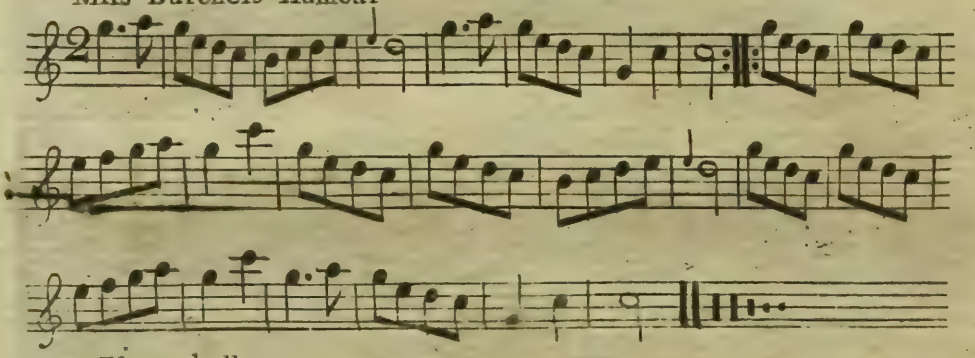
A Gavot



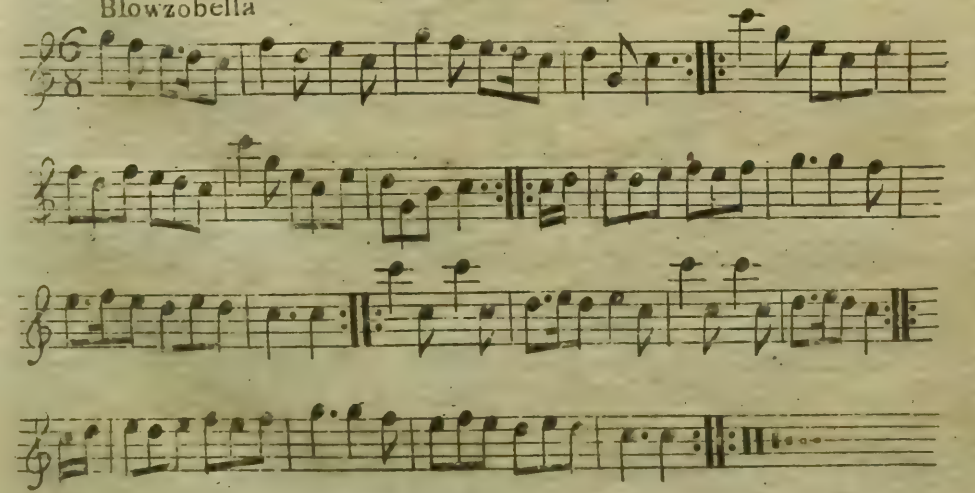
A Gigg *Bis*

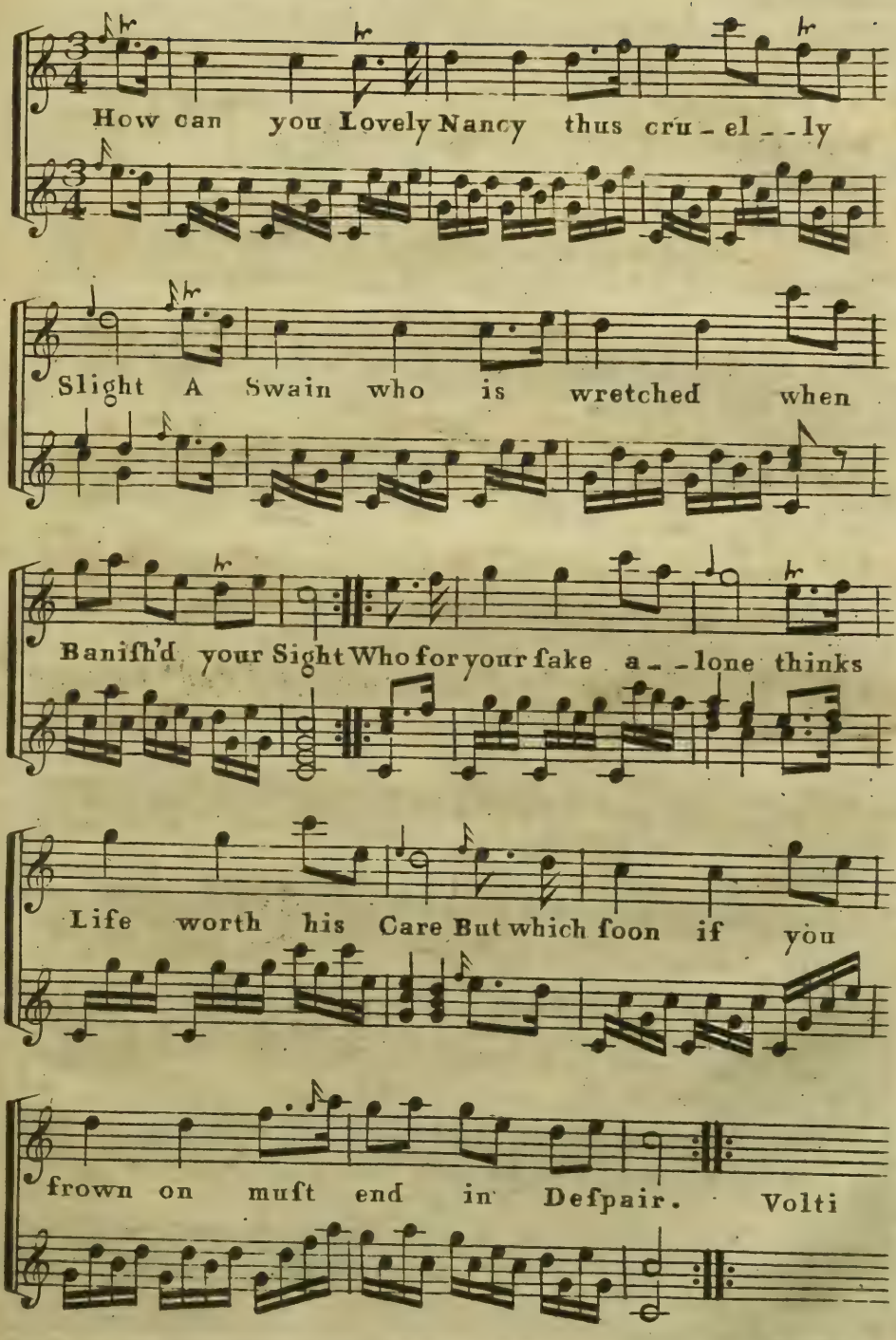


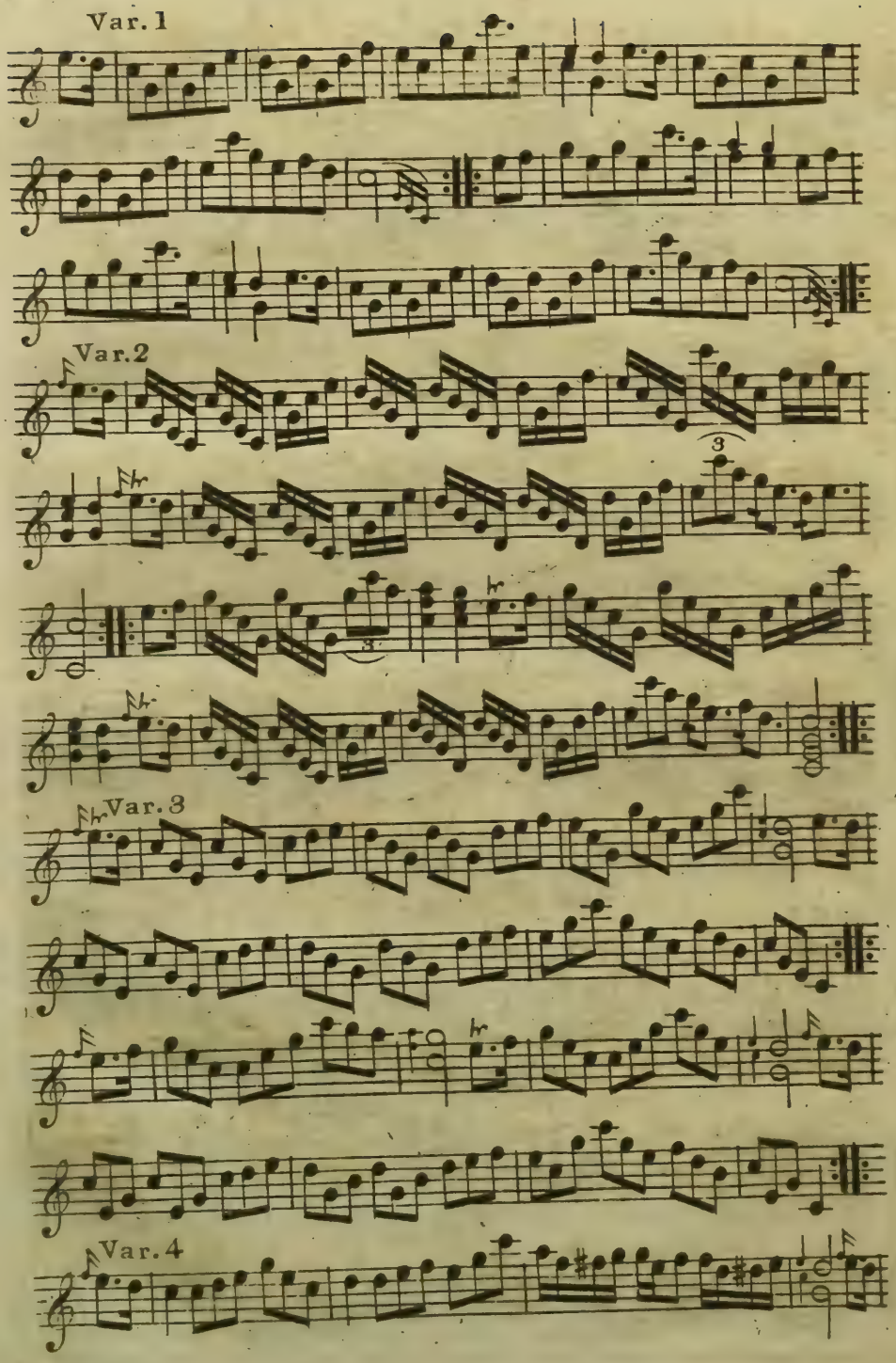
Miſs Burchels Humour

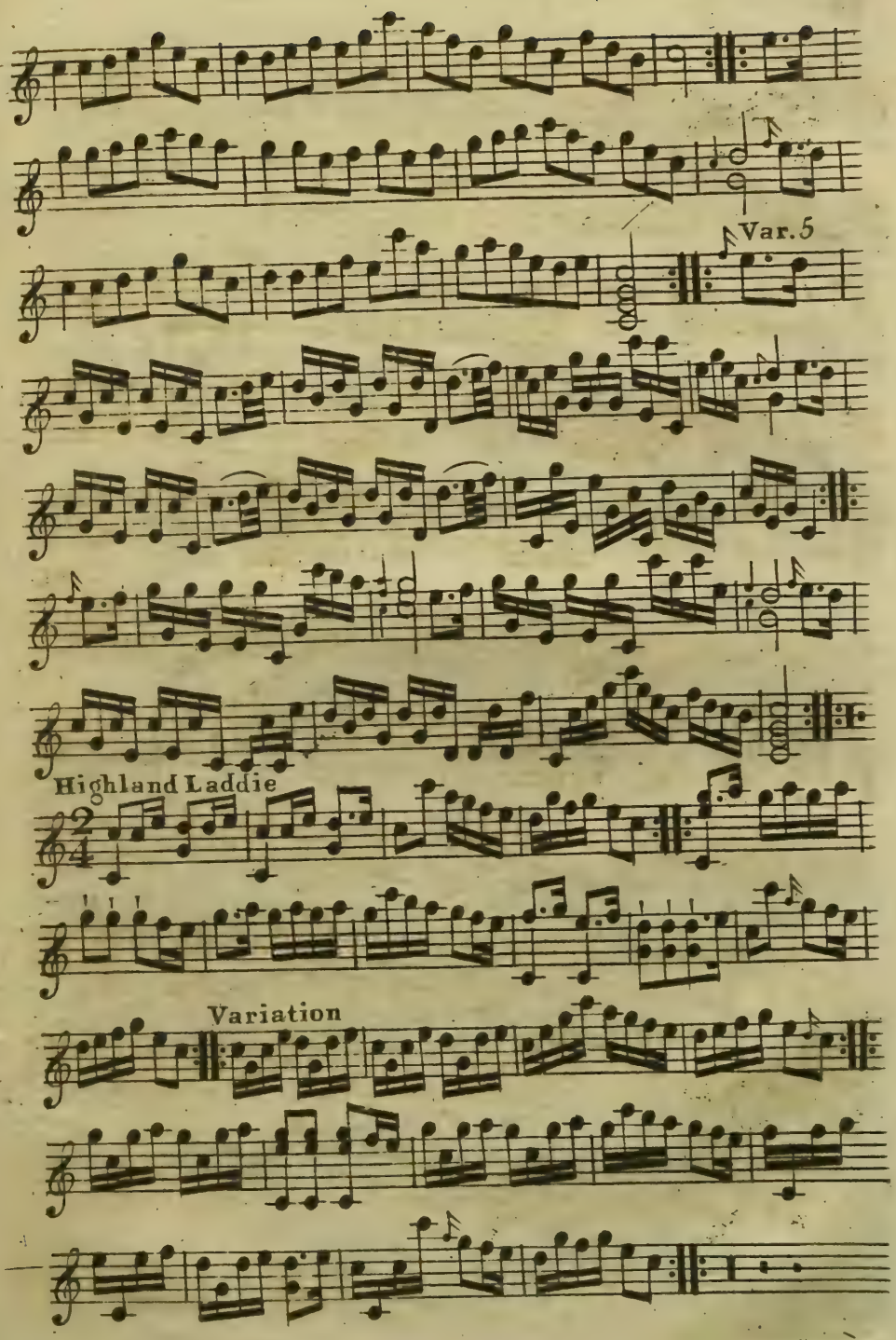


Blowzobella

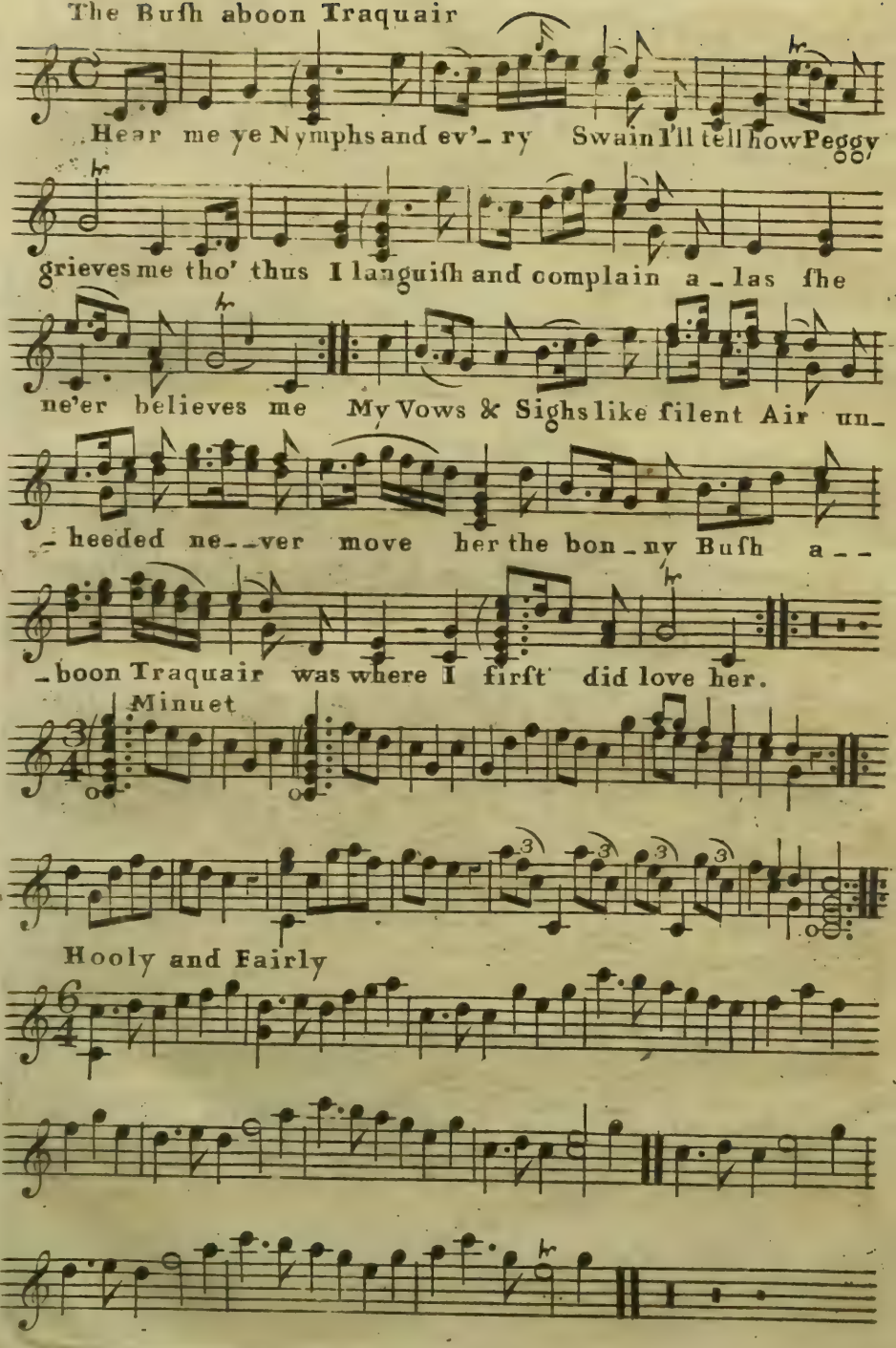



How can you Lovely Nancy thus cru - el - - ly
Slight A Swain who is wretched when
Baniſh'd your Sight Who for your ſake a - - lone thinks
Life worth his Care But which ſoon if you
frown on muſt end in Deſpair. Volti

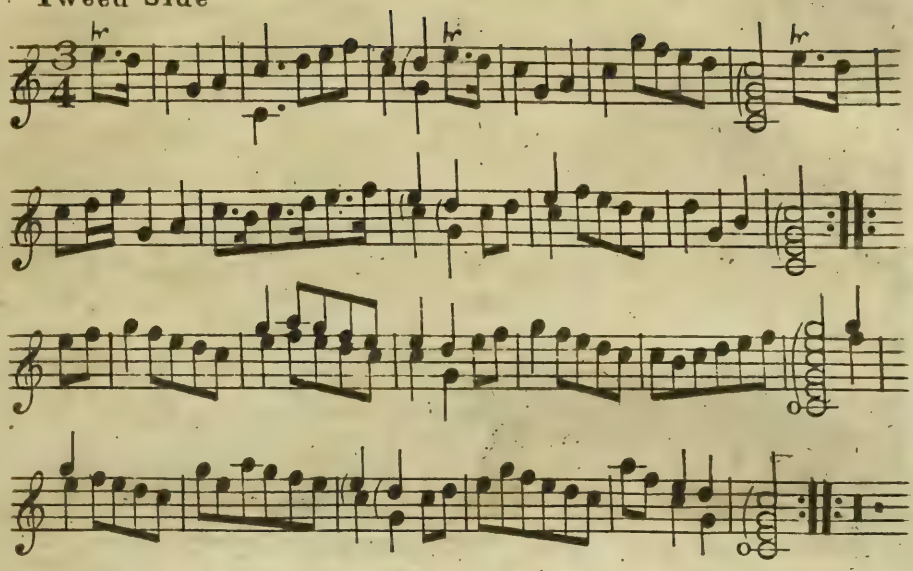

Var. 1
Var. 2
3
Var. 3
Var. 4


Var. 5
Highland Laddie
Variation

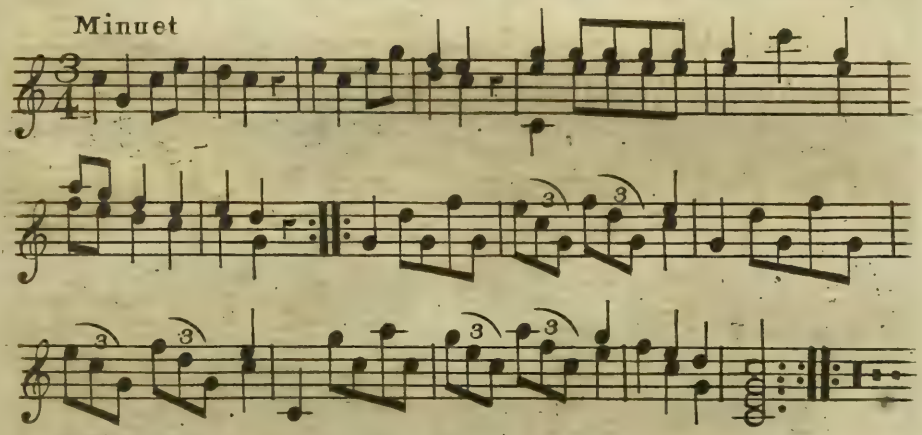
The Buſh aboon Traquair



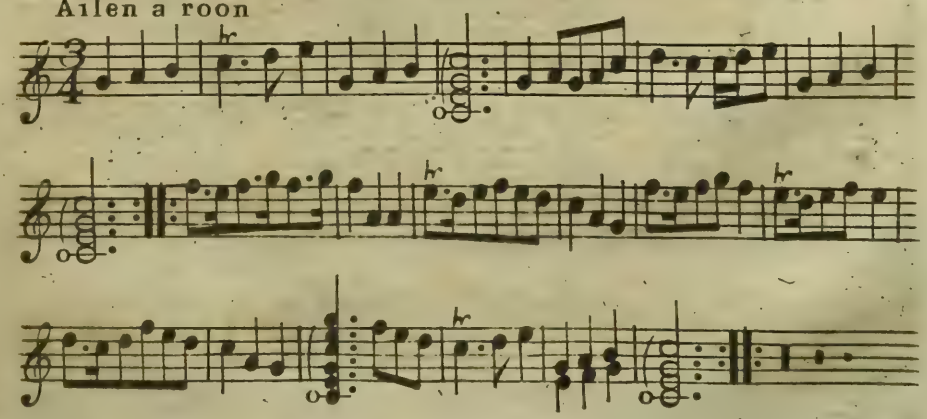
Tweed Side



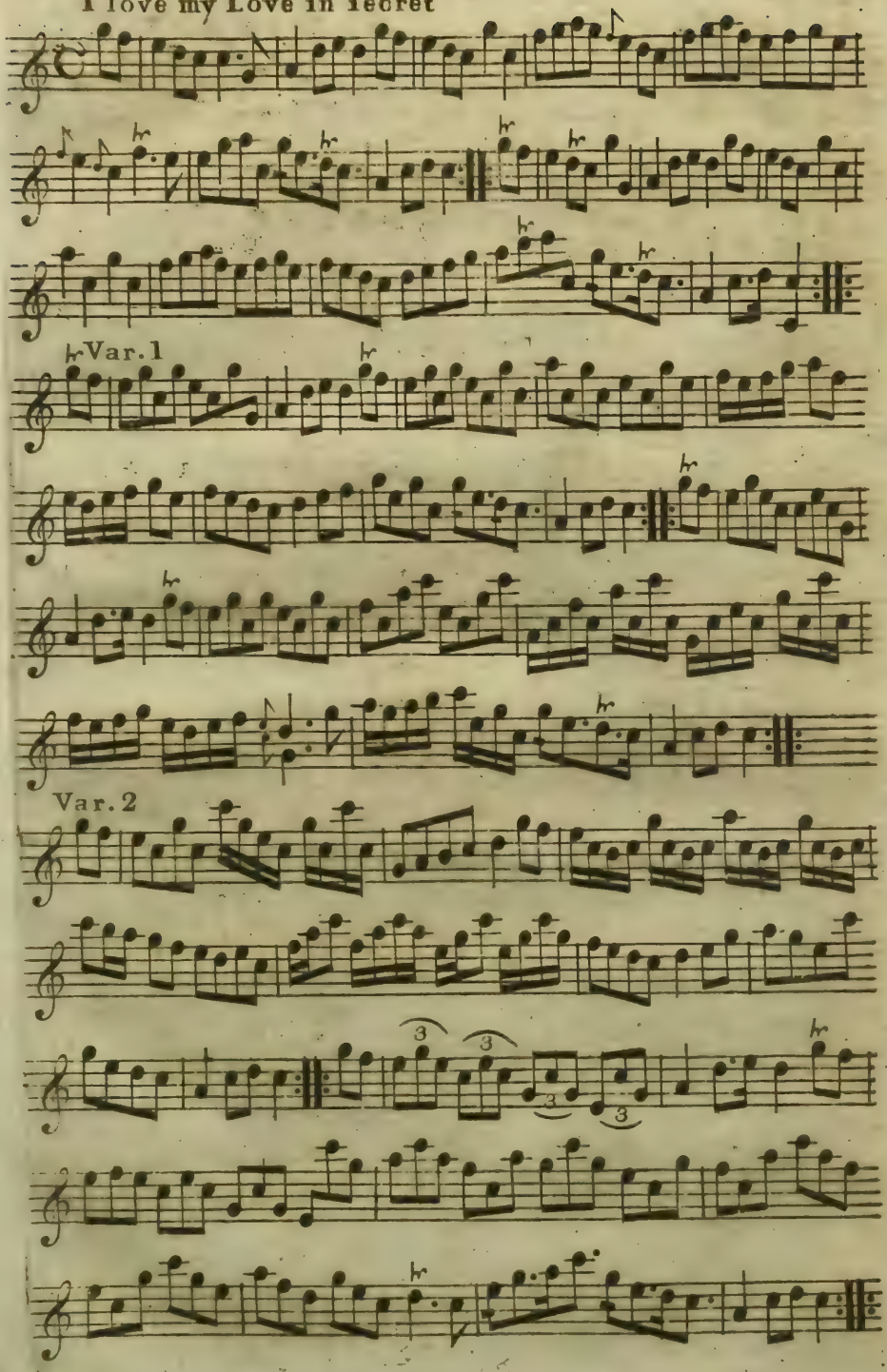
Minuet



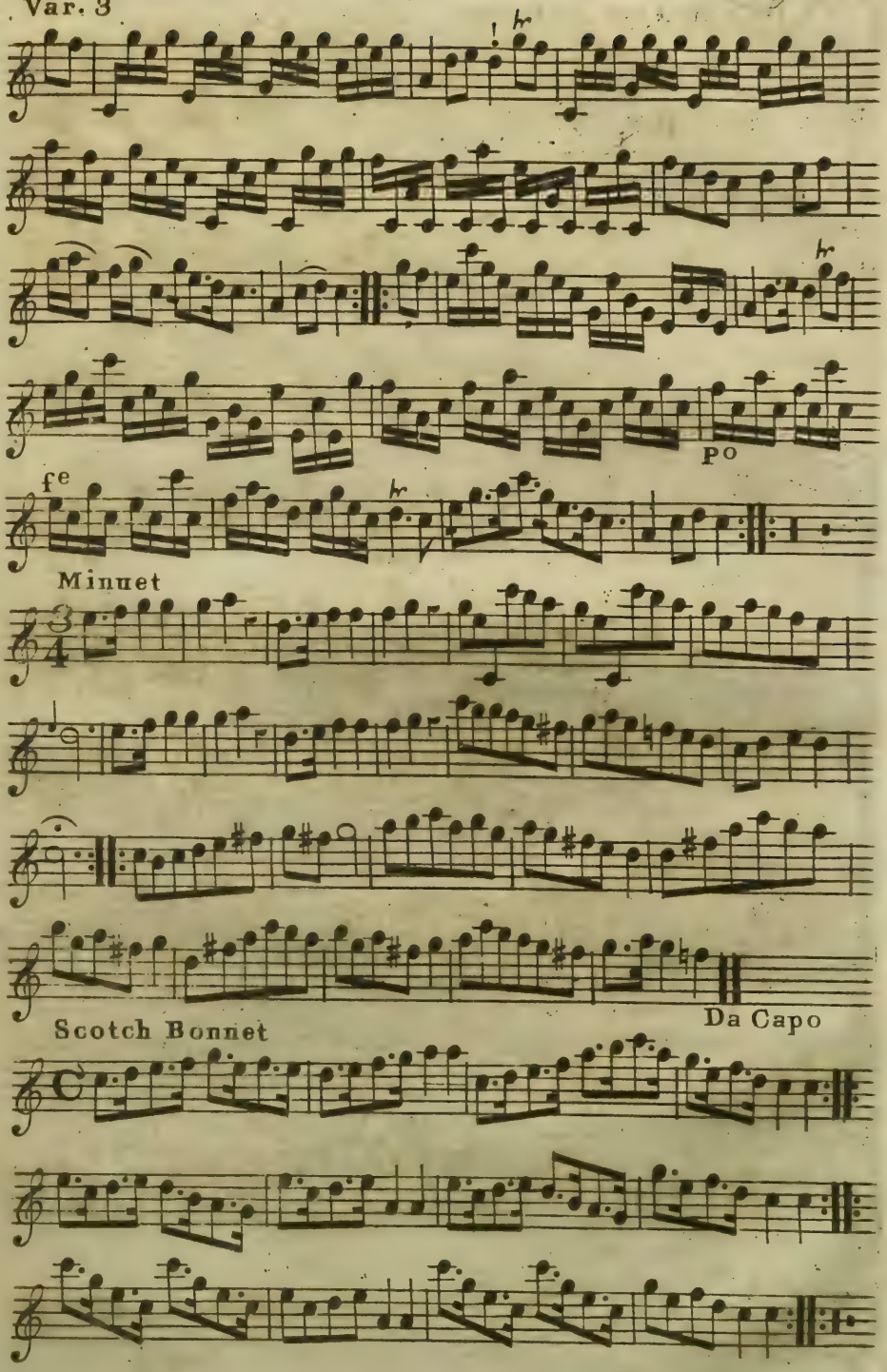
Ailen a roon



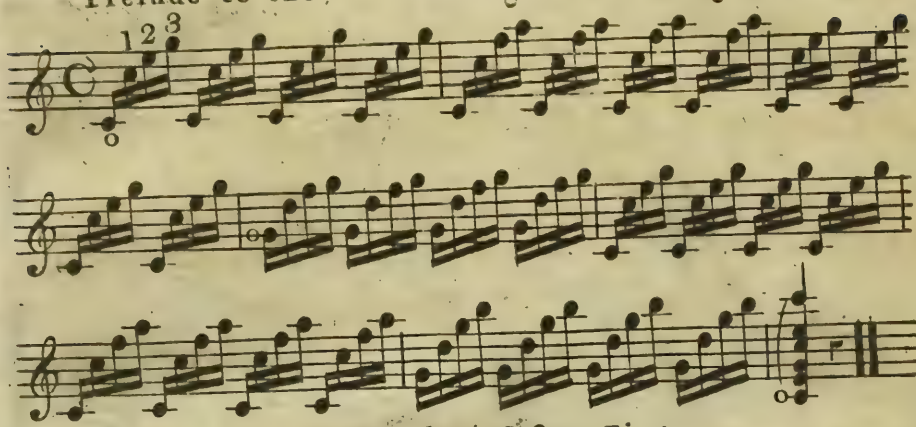
I love my Love in fecret



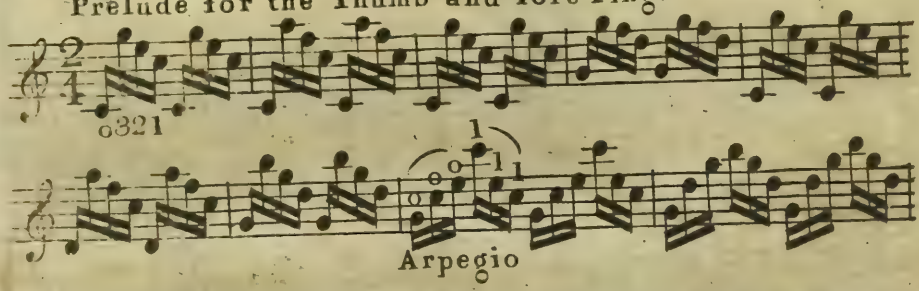
Var. 3



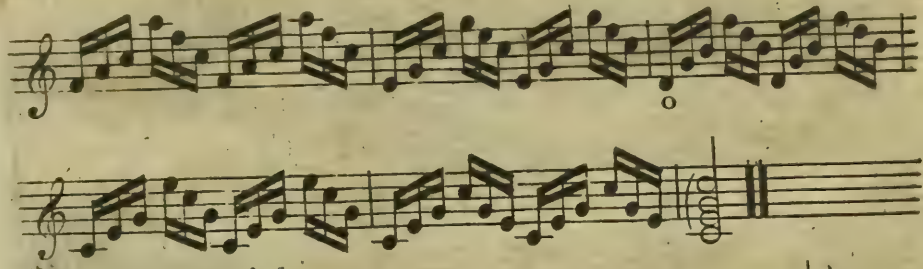
Prelude to exercife the right Hand Fingers



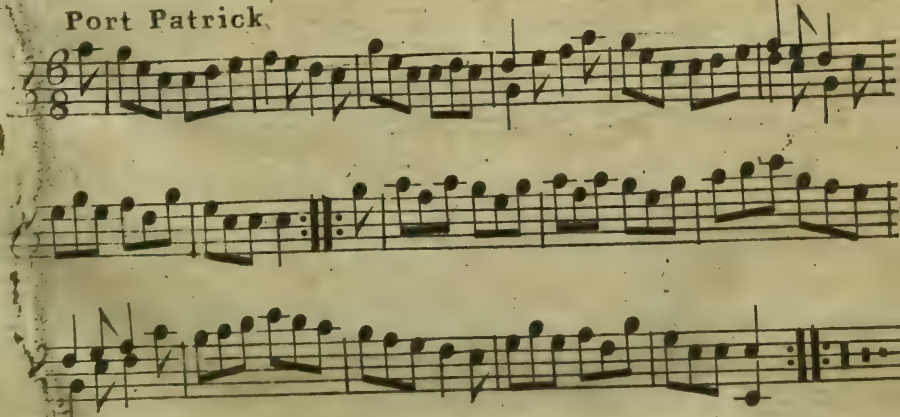
Prelude for the Thumb and fore Finger



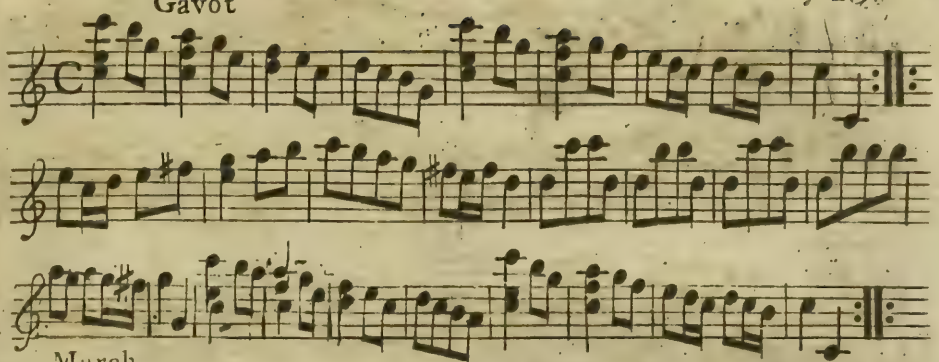
Arpegio



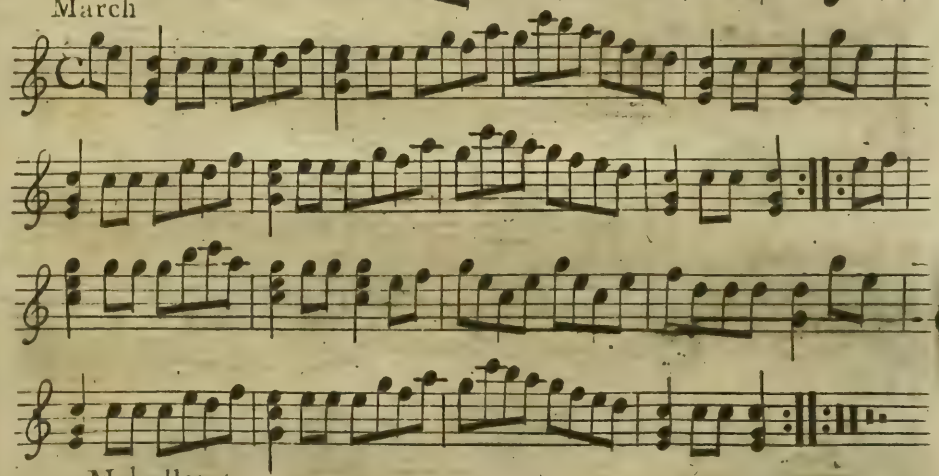
Port Patrick



Gavot



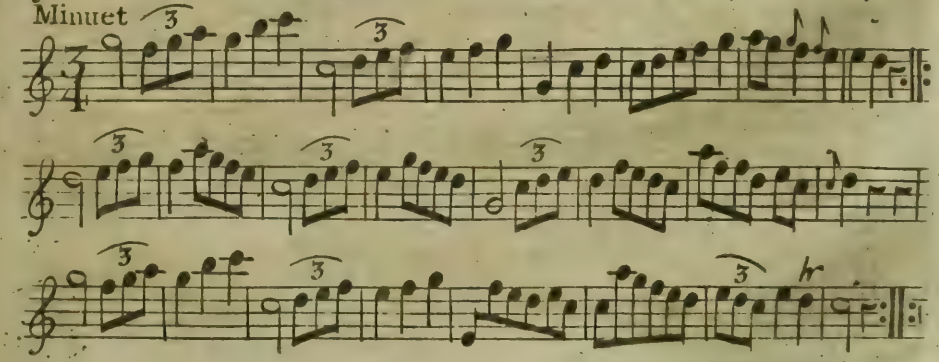
March



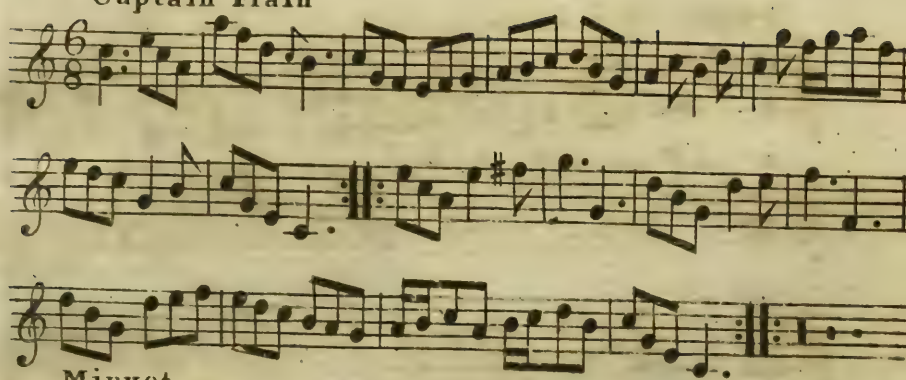
Mabelle



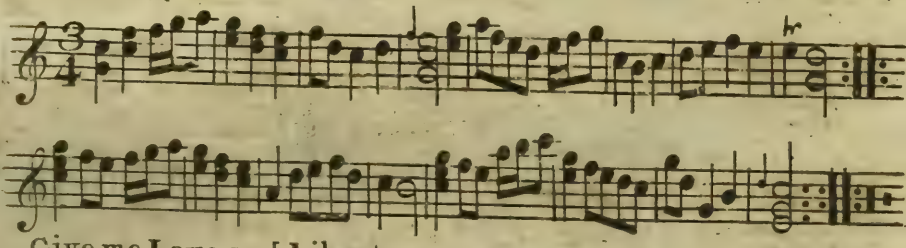
Minuet



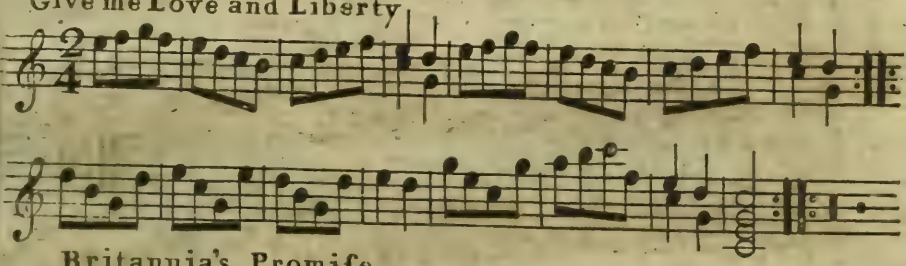
Captain Flash



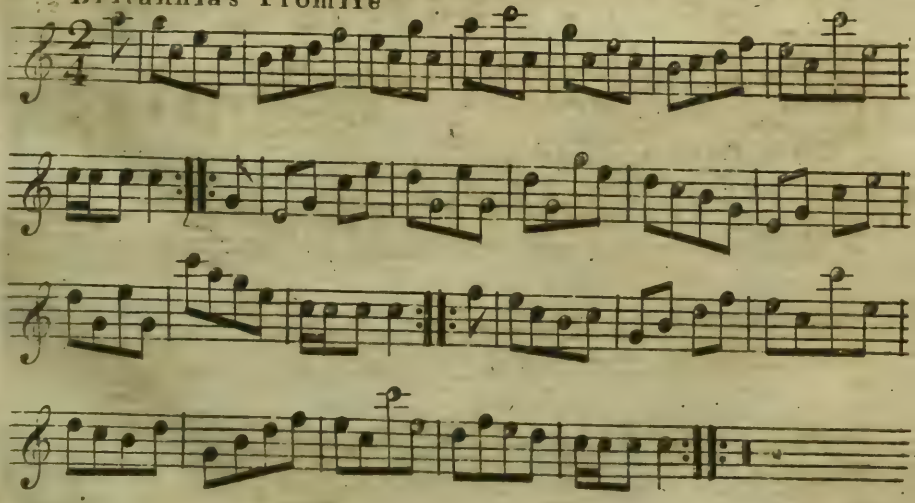
Minuet



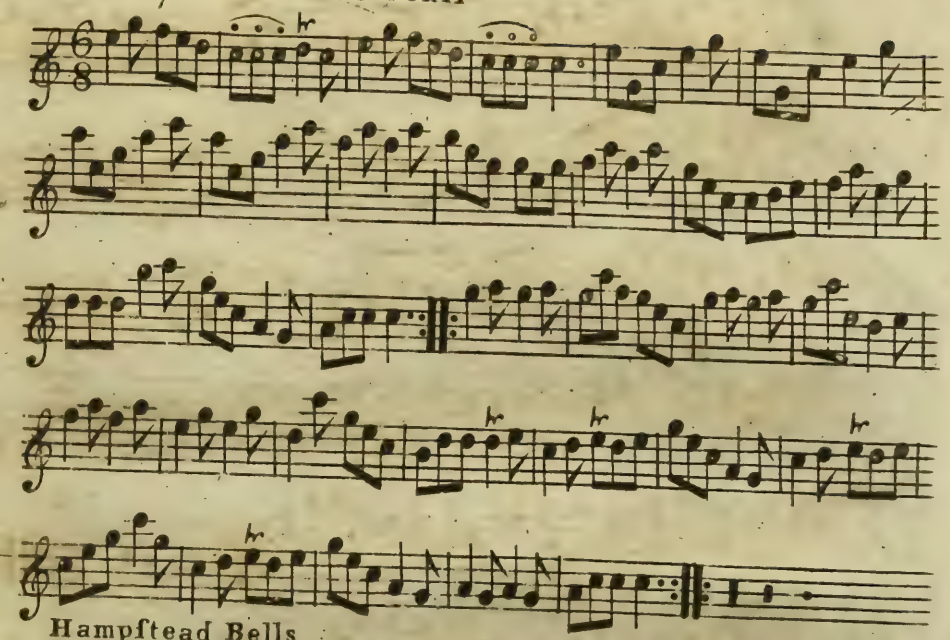
Give me Love and Liberty



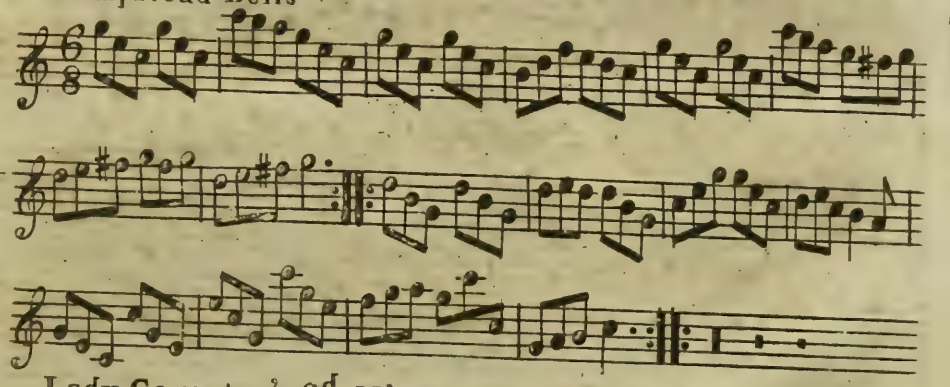
Britannia's Promise



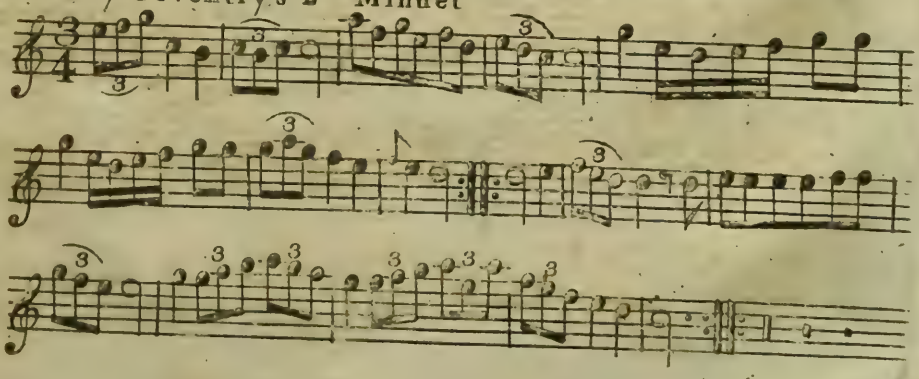
Family Tune in the Genii



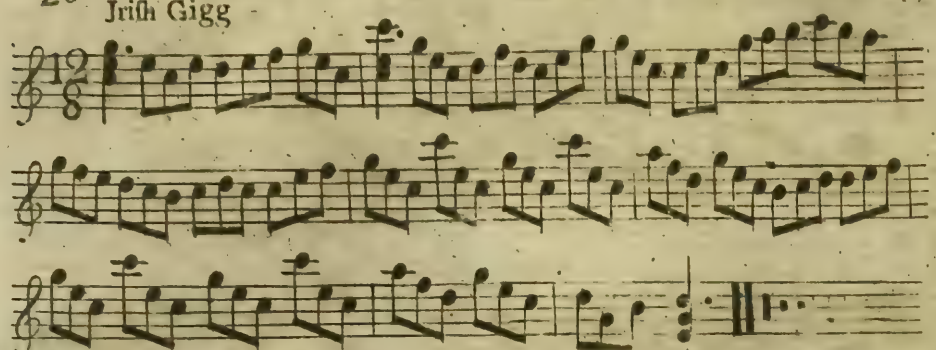
Hampstead Bells



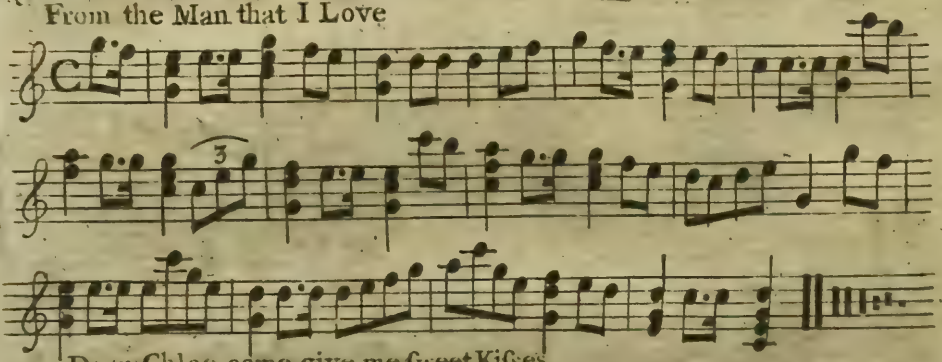
Lady Coventry's 2d Minuet



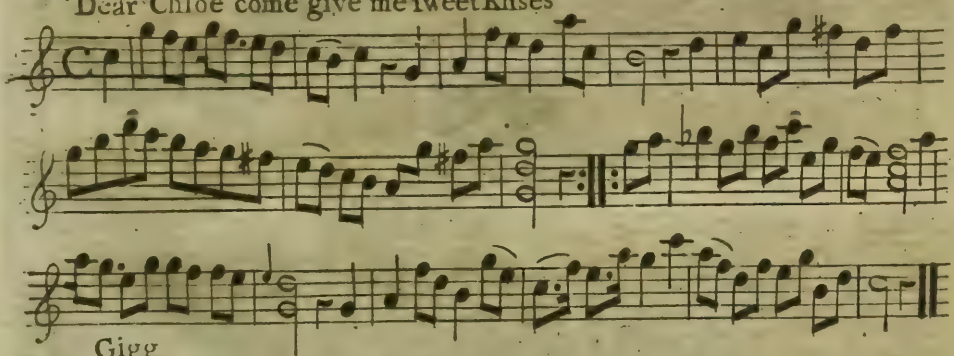
Irish Gigg



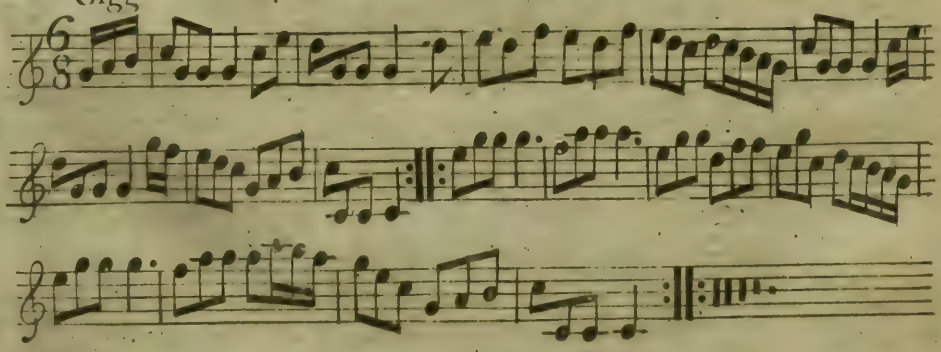
From the Man that I Love



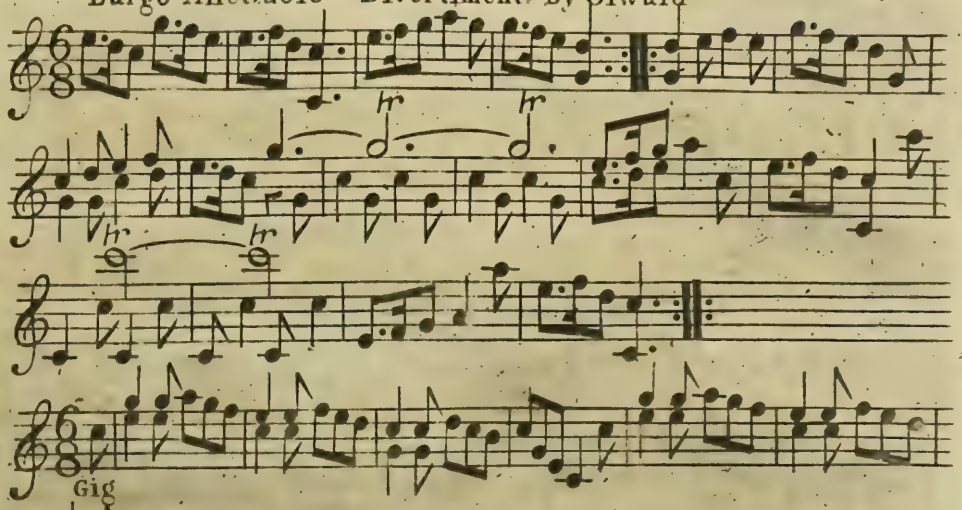
Dear Chloe come give me ſweet Kiſſes



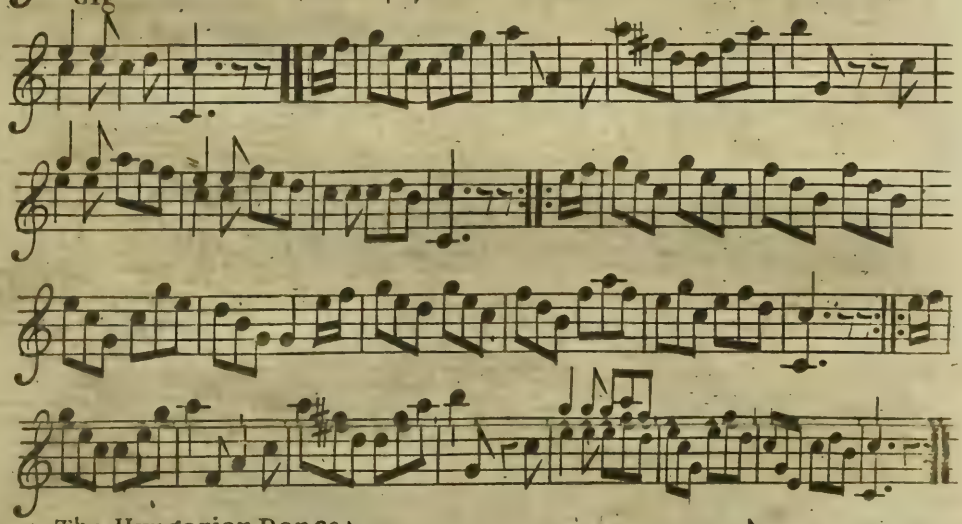
Gigg



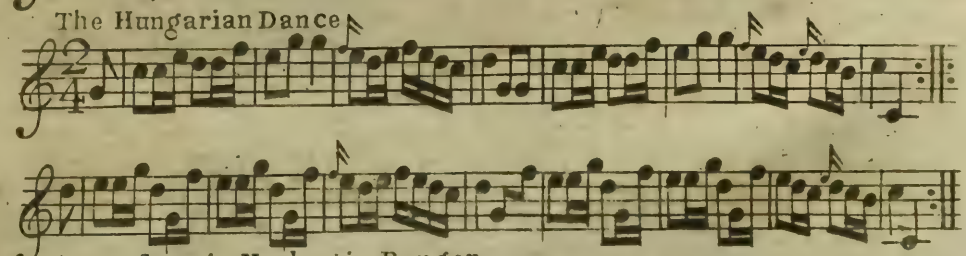
Largo Affettuoso Divertimenti by Oſwald



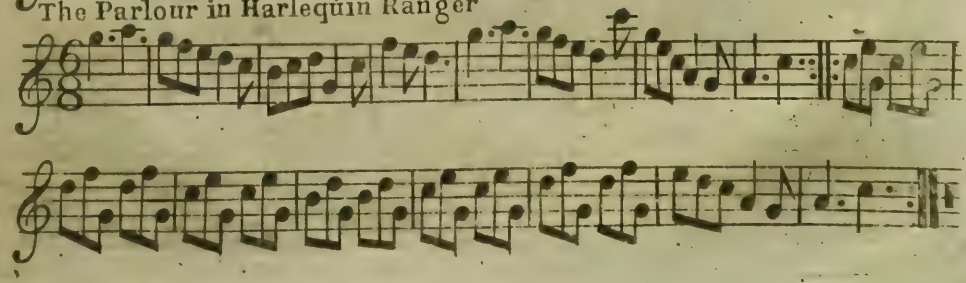
Gig



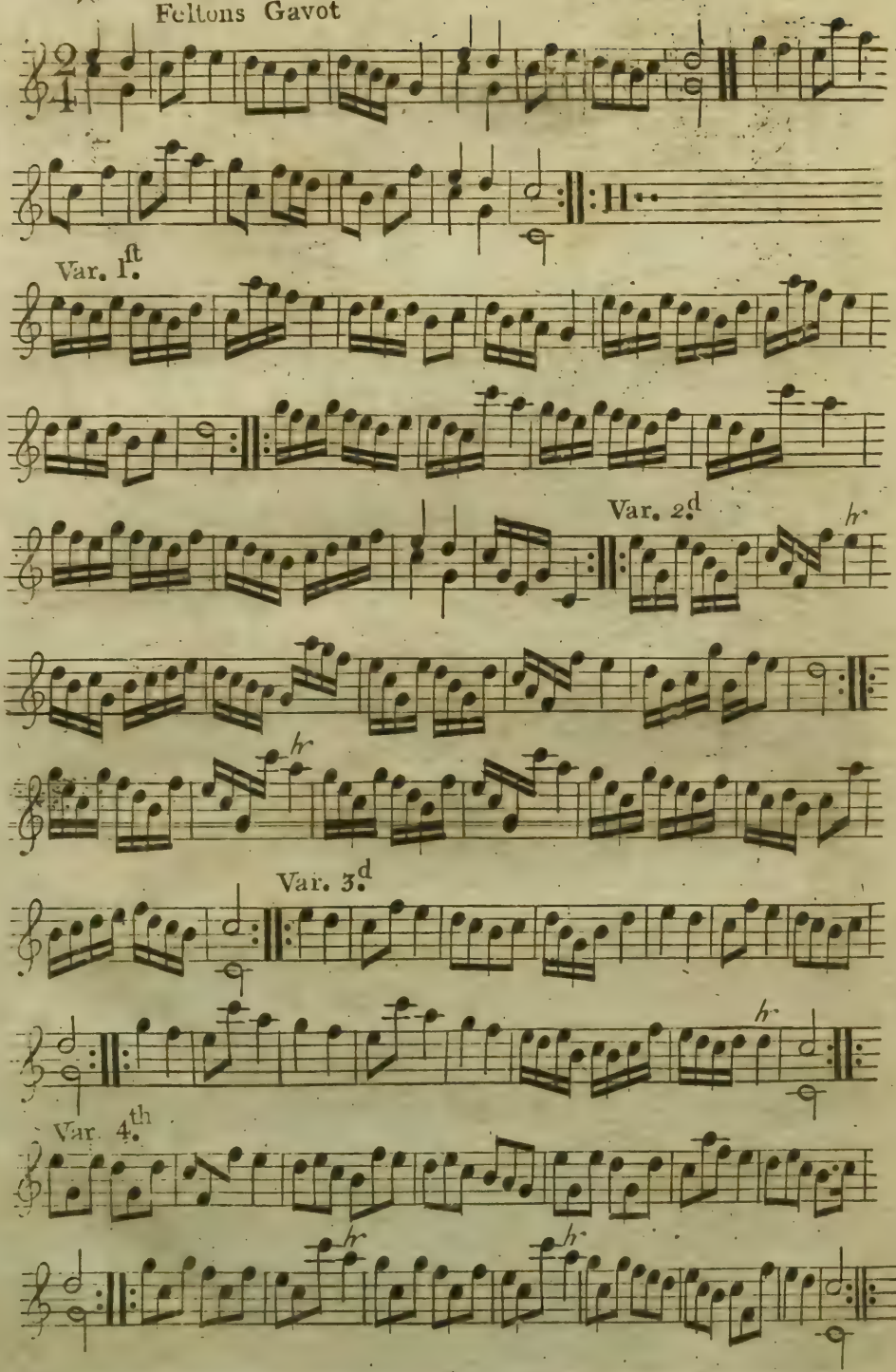
The Hungarian Dance

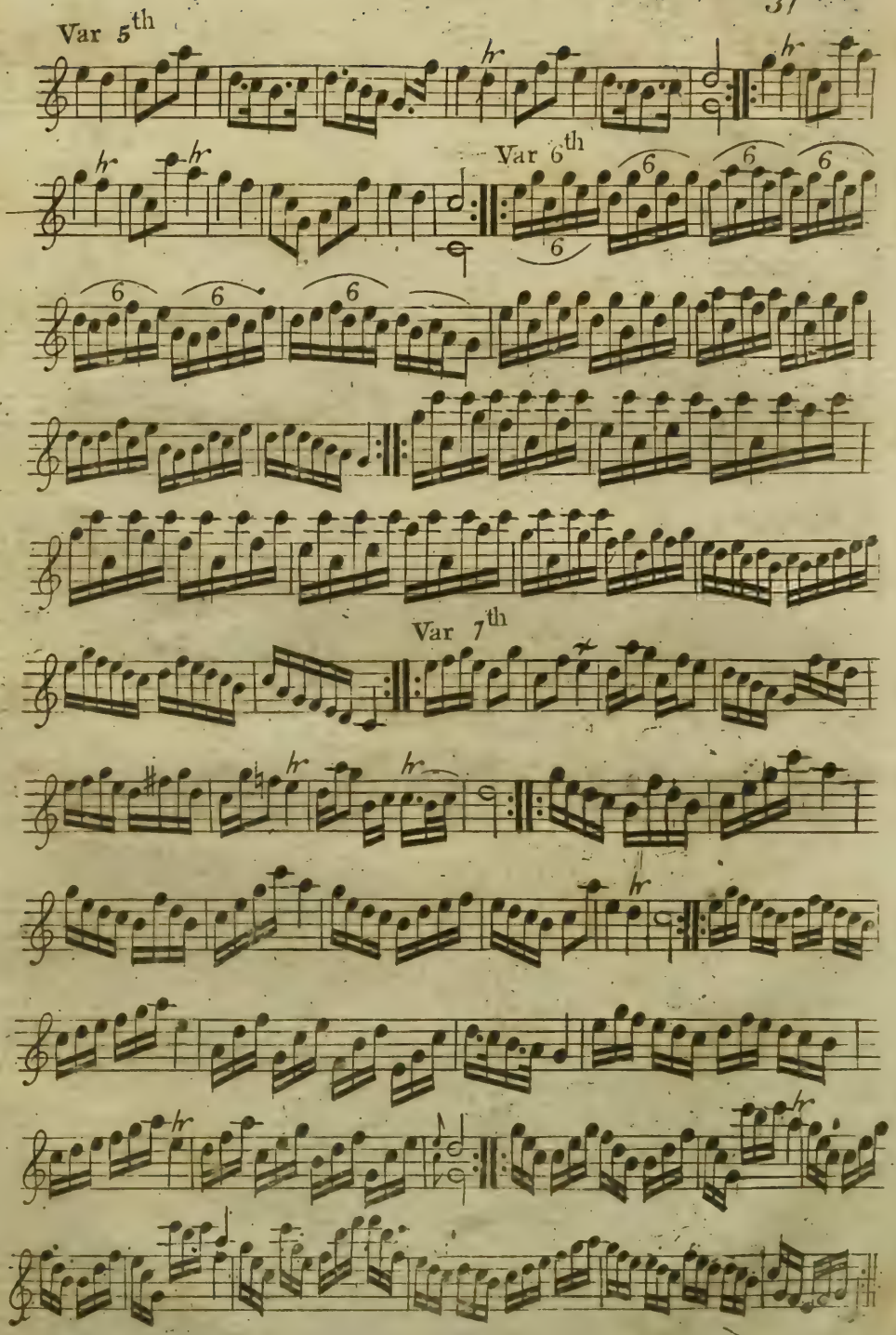


The Parlour in Harlequin Ranger



Feltons Gavot




Var 5th
Var 6th
Var 7th

Muſette in Alcina by Mr Handel

